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THE AMERICAN ORB WEAVERS OF THE GENERA *MECYNOGEA, MANOGEA, KAPOGEA* AND *CYRTOPHORA* (ARANEAE: ARANEIDAE)

HERBERT W. LEVI[1]

ABSTRACT. Nine species of *Mecynogea* are known, of which five are new: two from Mexico, one from Colombia, one from Brazil, and one apparently widespread from Venezuela to Mato Grosso state, Brazil. For the common southeastern North American *Mecynogea lemniscata,* new records are given from southern Brazil to northern Argentina. *Manogea* is a new genus with the common and widespread type species *M. porracea* and two new species, one in Central America, the other in northern Colombia and Venezuela. The four widespread American species previously placed in *Cyrtophora* are here placed in a new genus, *Kapogea.* These four species are difficult to distinguish using the genitalia as characters. The Old World *Cyrtophora citricola* has recently been found in Colombia, where it damages trees. There are 17 new synonyms.

INTRODUCTION

This is one of a series of revisions of the Neotropical orb weaver genera. Previous publications are cited in Levi (1993, 1996). In preparation are a key to the known genera of the American araneid orb weavers and revisions of the remaining unrevised araneid genera: *Cyclosa, Molinaranea, Mastophora, Agathostichus, Mangora, Eustala* and *Verrucosa.*

The orb weavers placed in the genera *Mecynogea* and *Cyrtophora* form a distinct group in the family Araneidae: their webs are horizontal, often dome-shaped, and supported by a tangled webbing. They are believed to lack viscid silk in the web (Kovoor and Lopez, 1982), and the dome has an extremely small, dry silk mesh (Plates 1, 2). Unlike other orb weavers, they do not reconstruct the web on a daily basis and may not remove old webs, but build a new one above the old (Plate 2C) (Lubin, personal communication). Whereas their silk glands differ from those of other araneids (Kovoor and Lopez, 1982, 1988), the external appearance of these spiders is not as distinct from other araneids as one might expect. Differences in their spinnerets are described by Coddington (1989) and Peters (1993). Peters also showed a secondary loss of some silk spigots in older spiders.

There is literature (Carico, 1984; Hieber, 1984) on the behavior and ecology of the basilica spider, *Mecynogea lemniscata,* and a recent paper by Willey et al. (1992) cites previous papers. Wise (1993), in his volume on the ecology of spiders, has many citations for *Mecynogea lemniscata.* The *Zoological Record* cites numerous papers on several *Cyrtophora* species. However, there is no literature on *Manogea* species, presumably because of the past difficulty of identifying the common *M. porracea,* and there is no literature on the species of *Kapogea,* which are less often collected despite the large size of females.

I am obliged to the curators and their assistants for making the collections available. I also thank M. E. Galiano for specimens (deposited in MACN) and C. L. Scioscia and P. Vanzolini for locating collecting sites. J. Carico, W. Eberhard, C. Hieber, Y. Lubin, N. C. Mesa C. and M. Robinson provided information on habits of the spiders. J. Coddington and Y. Lubin provided photographs. I am thankful to L.

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METHODS

The methods used have been described previously (Levi, 1993).

The distances between eyes of the anterior row are expressed as diameters of the anterior median eyes (in profile); distances between eyes of the posterior row are given as diameters of the posterior median eyes (in profile). The height of the clypeus (the distance between anterior median eyes and the edge of the carapace) is measured by the diameter of the anterior median eye (Levi, 1993, fig. 28f). These measurements are approximate. The median eye quadrangle is delineated along the outer margins of the median eyes.

In preserved specimens the abdomen is held at an angle to the prosoma. Because this angle is variable, depending on the condition of the specimen, measurements of total length were made with the anterior of the abdomen slightly pushed down. The total length is thus an approximation. Illustrations of the dorsal view were made with both prosoma and opisthosoma horizontal.

The male palpi, because they are softer than those of many other araneids, were expanded by immersion in 10% sodium hydroxide solution in water, followed by immersion in distilled water. The expanded palpi of many other araneids, described in previous papers, were often just pulled apart with needles.

MATERIALS

Collections Examined. The spiders studied here were made available from the following collections:

ACCH Academia de Ciencias de Cuba, La Habana, Cuba (L. F. de Armas)

AMNH American Museum of Natural History, New York, United States (N. Platnick, L. Sorkin)

BMNH Natural History Museum, London, England (P. Hillyard, F. Wanless)

CAS California Academy of Sciences, San Francisco, California, United States (W. J. Pulawski, D. Ubick, C. Griswold)

DU D. Ubick, San Francisco, California, United States

FSCA Florida State Collection of Arthropods, Gainesville, Florida, United States (G. B. Edwards)

INPA Instituto Nacional de Pesquisas da Amazônia, Manaus, Est. Amazonas, Brazil (E. H. Buckup, H. Höfer)

IRSNB Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (L. Baert)

JVN J. Vasconcellos-Neto, Campina, São Paulo, Brazil

MACN Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina (E. A. Maury, M. E. Galiano, C. L. Scioscia)

MCN Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil (E. H. Buckup, M. A. L. Marques)

MCP Museu de Ciências, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, RS, Brazil (A. A. Lise)

MCZ Museum of Comparative Zoology, Cambridge, Massachusetts, United States

MECN Museo Ecuatoriano de Ciencias Naturales, Quito, Ecuador (L. Avilés, Germania Estévez J.)

MLP Museo de Universidad Nacional, La Plata, Argentina (R. F. Arrozpide, C. Sutton)

MNHN Muséum National d'Histoire Na-

turelle, Paris, France (J. Heurtault, C. Rollard)

MNRJ Museu Nacional, Rio de Janeiro, Brazil (A. Timotheo da Costa, Adriano Brilhante Kury)

MUSM Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru (D. Silva D.)

MZSP Museu de Zoologia, Universidade de São Paulo, São Paulo, SP, Brazil (P. Vanzolini, J. L. Leme, R. Pinto da Rocha)

MZUF Museo Zoologico de "La Specola" Università di Firenze, Florence, Italy (S. Whitman)

NMB Naturhistorisches Museum, Basel, Switzerland (A. Hänggi)

NRMS Naturhistoriska Riksmuseet, Stockholm, Sweden (T. Kronestedt)

PAN Polska Akademia Nauk, Warszawa, Poland (J. Prószynski, A. Slojewska, W. B. Jedryczkowski, T. Huflejt)

SMF Forschungsinstitut Senckenberg, Frankfurt am Main, Germany (M. Grasshoff)

USNM National Museum of Natural History, Smithsonian Institution, Washington, D.C., United States (J. Coddington, S. F. Larcher)

ZSM Zoologische Staatssammlung, Munich, Germany

RELATIONSHIPS

Mecynogea and two of the three species here placed in *Manogea* differ from most other orb weavers by having a procurved posterior eye row as in *Argiope* and *Gea*. The posterior lateral eyes are anterior to the posterior medians (Figs. 1, 20). Is this homoplasy? One species of *Manogea*, *M. porracea* (Figs. 79, 88), and the four species of *Kapogea* (Figs. 107, 118), have the posterior eye row straight. The remaining araneid orb weavers, including most *Cyrtophora* species (which are related to *Mecynogea* and *Kapogea* by their unusual spinning habits), have the eyes of the posterior row recurved, the lateral eyes posterior to the medians (Fig. 152; Table 1).

Another character, perhaps more unusual, combines these three genera and *Cyrtophora* and may place them with *Argiope* and *Gea*. In all, the femur of each leg is about the same length as the combined patella and tibia of the same leg: the first slightly shorter, the second about the same, the third and fourth slightly longer. Also, the combined metatarsus and tarsus is longer than the combined patella and tibia of the same leg. In other words, the patellae and tibiae of this group are relatively shorter than in all other araneid genera (Table 1).

The hooded epigynum of *Mecynogea* (Fig. 5; [6] in Table 1) resembles that of *Argiope aurantia* Lucas (Levi, 1968, fig. 49; [10] in Table 1), and the lobed epigynum of other *Mecynogea* (Figs. 55–61) resembles *Argiope trifasciata* (Forskål) (Levi 1968, figs. 68, 69).

All evidence points to a clade embracing *Mecynogea, Manogea, Kapogea, Cyrtophora* and *Argiope* and *Gea*.

TAXONOMIC SECTION

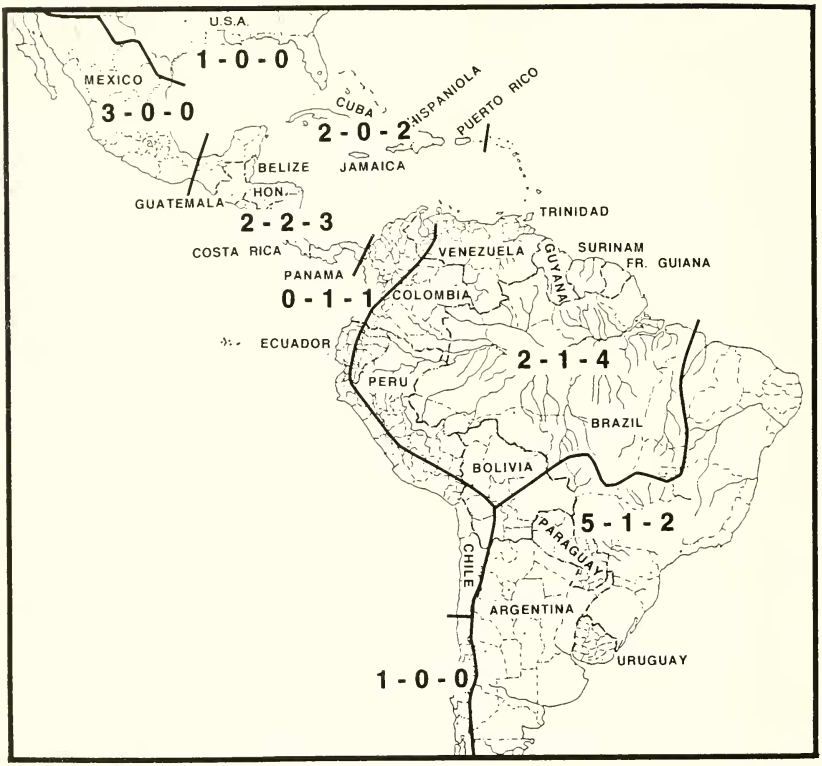
Mecynogea Simon

Hentzia McCook, 1894: 244. Type species by monotypy *Epeira basilica* McCook (=*M. lemniscata*). Name preoccupied by *Hentzia* Marx, 1883.

Mecynogea Simon, 1903: 25. Type species *M. bigibba* designated by Petrunkevitch, 1911: 360. Neave, 1940: 679. Roewer, 1942: 747. The gender of the name is feminine (Bonnet, 1957: 2744).

Allepeira Banks, 1932: 23. New name to replace *Hentzia* McCook, preoccupied. First synonymized with *Mecynogea* by Levi, 1980: 11.

Diagnosis. Mecynogea differs from most araneid orb weavers (including *Kapogea* and *Cyrtophora*) by having the posterior row of eyes procurved (Figs. 1, 15, 20), the lateral eyes anterior to the medians in dorsal view, as in *Gea* and *Argiope*. *Mecynogea* differs from *Gea* and *Argiope* by having a cylindical to oval abdomen with a pair of anterior dorsal tubercles (Figs. 15, 17; Table 1) and having three dark bands on the yellowish carapace (Figs. 1, 20), whereas in *Gea* and *Argiope* the abdomen



Map 1. The number of species of the three genera: first number *Mecynogea* species, second *Manogea* species, third *Kapogea* species.

is oval to shield-shaped (Levi, 1968, figs. 36, 52, 61), is dorsoventrally flattened, and often has transverse bands and the carapace without longitudinal bands. *Mecynogea* differs from *Manogea* by having the dorsal abdominal bands wavy at the middle of the abdomen (Figs. 15, 17, 31, 37, 51, 52, 76; Table 1), whereas in *Manogea* the bands are straight but disappear anteriorly (Figs. 85, 97, 103).

The epigynum of *Mecynogea* differs from that of *Manogea* by having a round hood with a large posterior opening (Figs. 4–6, 26, 27) or a sclerotized, projecting posterior median plate with the ducts opening in slits (Figs. 55–57, 59–61, 67–69, 73–75; [6] in Table 1), whereas *Manogea* has a pair of distinct openings in a cup-like structure (Figs. 82–84, 94–96, 100–102; [7] in Table 1). The male palpus of *Mecynogea* has a two-branched structure, considered the terminal apophysis, covering the embolus (Figs. 21, 22, A in Figs. 24, 25), the proximal branch (PB) covering part of the medial side and the distal branch (DB) covering the distal side

Table 1. Some characters belonging to the genera revised here with *Argiope* and *Alpaida*[a]

	MEC[c]	MAN	KAP	CYR	ARG	ALP
Female[b]						
A line and 2 dark areas on carapace	+	+	−	−	−	−
Ceph. region width < 0.5 thorac. region	+	+	−	−	+	−
Lateral groove betw. ceph. & thorac. region	−	−	+/−	+/−	+/−	+
ALE facing venter	−	−	−	−	[+]	−
PE row procurved	+	+/−	−	−	+	−
PE row straight	−	−/+	+	−/+	−	−
PE row recurved	−	−	−	+/−	−	+
AME closer to ALE than each other	+	+/−	−	−	−	−
PME equally spaced	+	+	−	−	−	−
LE on small tubercle	−	−	+	+	+	−
LE separated by 0.5 Ø +	−	−	+	+	−	−
Ocul. quadrangle longer > wide	+	+	+	+	+	−
Femur i >/= patella + tibia	+/−	+	−	−	−	−
Femur iii, iv >/= patella + tibia	+	+	+	+	+	−
Metatarsus + tarsus > patella + tibia	+	+	+/−	+	+	−
Legs thick	−	−	+	+	−	−
Abdomen shape	1	1	[2]	[3]	[4]	[5]
Abdomen with straight longitudinal bands	−	[+]	−	−	−	−
Abdomen with wavy longitudinal bands	[+]	−	−	−	−	−
Epigynum structure	[6]	[7]	[8]	[9]	[10]	[11]
Aggregate silk glands	small	−	−?	−	+	+
Flagelliform silk glands	−	−	−?	−	+	+
Male						
Ceph. region width < 0.5 thorac. region	+	+	−	−	+	+
PE row procurved	+	−/+	−	−	+	−
PE row straight	−	+/−	+	−/+	−	−
AME closer to LE than each other	+	+	+	+	+	−
PME equally spaced	+	+	+/−	−	−	−
LE separated by 0.3 Ø +	−	−	+	+	−	−
ALE faces ventrally	−	−	−	−	[+]	−
Femur i longer > patella + tibia	−	−	−	−	−	−
Femur iii/iv >/= patella + tibia	+	+/−	+	+	+	−
Tarsus + metatarsus >/= patella + tibia	+	+	+	+	+	−
Legs thick	−	−	+	+	−	−
Abdomen shape	1	1	[2]	[3]	[4]	[5]
Abdomen with straight longitudinal bands	−	[+]	−	−	−	−
Abdomen with wavy longitudinal bands	[+]	−	−	−	−	−
Endite tooth	−	+/−	−	−	−	+
One palpal patellar seta	+	+	+	+	+	+
Hook on coxa i	−	−	−	−	−	+
Male length as % length of female	70–107	58–76	<24	18	35–50	100
A biforked	[+]	−	−	−	−	−
M small, soft	[−]/+	+	+	+	−	−
Embolus support	A	A	A	C	C	C

[a] Genera: ALP, *Alpaida*; ARG, *Argiope*; CYR, *Cyrtophora*; KAP, *Kapogea*; MAN, *Manogea*; MEC, *Mecynogea*.

[b] Abbreviations: A, terminal apophysis; ALE, anterior lateral eyes; AME, anterior median eyes, C, conductor; ceph., cephalic; LE, lateral eyes; M, median apophysis; ME, median eyes; ocul., ocular; PE, posterior eyes; PME, posterior median eyes; betw., between; thorac., thoracic.

[c] Codes: >, longer than; <, less than; >/=, longer or equal; =, same; +, present; −, absent; −/+, absent, present in some species; Ø, diameter; [ ], synapomorphy for the species included in the genus; ?, not known.

of the palpus (Figs. 24, 25), whereas *Manogea* has a soft terminal apophysis.

Description. Females. Coloration similar in all species. Carapace yellowish, with three dark bands (Figs. 1, 20). Chelicerae yellowish, labium and endites brown. Sternum brown with an irregular median, longitudinal light band. Legs yellowish, femora with longitudinal dark lines, distal articles with indistinct dark rings. Abdomen dorsum with longitudinal bands that undulate in middle of abdomen (Figs. 15, 31, 52), venter blackish, with paired white bands, most anterior longest, most posterior a round patch on sides of spinnerets (Fig.16).

Cephalic region of carapace about half or less of maximum width of carapace (Figs. 1, 20). Eyes similar in size, but anterior median eyes slightly the largest, anterior laterals smallest, posterior medians and laterals intermediate (Figs. 1, 20). Anterior median eyes one diameter or slightly less apart, closer to laterals; posterior median eyes one diameter or slightly more apart, same distance from laterals (Figs. 1, 2, 18, 20). Ocular quadrangle wider in front than behind, quadrangle longer than wide in front (Figs. 2, 18, 20). Height of clypeus equals 0.4 to 0.8 diameter of anterior median eye (Fig. 2). Legs relatively long, with length of first patella and tibia almost twice width of carapace. First and second femora slightly shorter than accompanying patella and tibia; third and fourth slightly longer. All legs with metatarsus and tarsus longer than patella and tibia of same leg. Legs with short setae and with scattered, relatively long setae at right angles to axis of leg.

Males. Slightly larger or smaller than females and similar in structure and coloration. Height of clypeus as in female (Fig. 18). Endite tooth lacking, coxal hook lacking, palpal patella with one macroseta. Legs as in female.

Genitalia. Epigynum with median posterior lobe, an extension of median posterior sclerite (Figs. 55, 59, 67, 73, *M. ocosingo, M. bnique, M. apatzingan*), triangular in shape (Fig. 73, *M. martiana*) or with dome-shaped hood hiding cavity with a large posterior facing opening (Figs. 4–6).

Male palpus with a pair of branches, perhaps homologous with the terminal apophysis, covering the distal and mesal sides of the palpus (A in Fig. 24). Median apophysis lost in males whose females have a hood-like epigynum, present in those lacking the hood: *M. apatzingan* (at 4h in Fig. 71, between center and 6h in Fig. 72), *M. martiana* (between center and 9h in Fig. 78) and *M. ocosingo* (at 4h in Fig. 63). Conductor on margin of tegulum (C in Fig. 25). Palpal tibia with several long setae.

Silk Glands. Mecynogea species lack flagelliform silk glands (which produce the axial thread of viscid silk) but, unlike species of *Manogea* and *Cyrtophora,* have small aggregate glands (producing viscid silk). The silk glands were studied in *Mecynogea lemniscata* and in *Manogea porracea* (=*Mecynogea guianensis*) by Kovoor and Lopez (1988).

Relationship. The horizontal, dome-shaped web (Plates 1A, B) and the absence of flagelliform silk glands allies *Mecynogea* with *Manogea, Kapogea* and *Cyrtophora,* as do the unusual leg lengths, the third and fourth femur being equal to or slightly longer than the patella and tibia of the same leg and all metatarsi and tarsi longer than the patella and tibia of the same leg. But *Manogea* and *Cyrtophora,* and probably also *Kapogea,* have lost their aggregate glands, which are still present but small in *Mecynogea.* Whereas small males of araneid species usually loose their endite tooth and coxal hook, *Mecynogea* males also lack them, despite being equal in size to females. *Argiope* lack these structures, but it is uncertain whether this loss is a synapomorphy with *Mecynogea* or convergence resulting from small male size. The unusual proportions of leg articles, relatively long femora, metatarsi and tarsi compared with the corresponding pa-

Plate 1. A, *Mecynogea bigibba* female hanging in web, from São Paulo. B, orb on bottom and eggsac in center of photograph of *Manogea porracea*, in Panama; in center are also orbs of uloborids.

tellae and tibiae, is also found in *Argiope* species.

Natural History. All *Mecynogea* species make a horizontal, dome-shaped web with small mesh and lacking viscid threads (Plate 1A), as do *Manogea* (Plate 1B), *Kapogea* (Plate 2C) and *Cyrtophora.* The common name "basilica spider" presumably reflects the domed design of the orb web.

Distribution. Mecynogea species are found only in the Americas (Maps 1, 2).

Separating Species. Because the general appearance of all species is the same, genitalia are used to distinguish species. Because the male palpi have less variation than the epigyna, males are easier to distinguish than females. Before males were found for South American *M. lemniscata* and *M. bigibba*, the females of both were considered to represent several species.

KEY TO FEMALE *MECYNOGEA*

1. Epigynum with bulging hood having a large opening facing posteriorly (Figs. 4, 5, 26, 27, 34, 35, 40, 41) 2
– Epigynum without hood (Figs. 55, 56, 59, 60, 67, 68, 73, 74) 5
2(1). Epigynum with notch on posterior margin of hood (Figs. 34, 35); Venezuela to Mato Grosso, Brazil (Map 2A) ..... *sucre*
– Rim of hood without notch (Figs. 4, 26, 40) 3
3(2). Slit-shaped openings of ducts visible dorsally within cavity of hood (bottom of Fig. 27, Figs. 41, 44) 4
– Slit-shaped openings not visible within cavity of hood (Figs. 5, 8, 11, 14); southeastern Brazil, Uruguay (Map 2C) ..... *bigibba*
4(3). Slit-shaped openings of ducts visible along dorsal margin of hood opening; (Figs. 41, 44, 47, 50); bottom of cavity often with longitudinal ridge (Figs. 41, 44, 50); Maryland to Missouri, United States to northern Argentina (Map 2A) ..... *lemniscata*
– Slit-shaped openings of ducts on sides of triangular dorsal median plate (at 5h and 7h in Figs. 27, 30); bottom of depression with a longitudinal groove (Figs. 27, 30); Minas Gerais, Brazil, to Argentina and Chile (Map 2B) ..... *erythromela*
5(1). Epigynum of triangular shape, in ventral view, bearing a shallow transverse groove (Fig. 73); Cuba, Hispaniola (Map 2D) ..... *martiana*
– Epigynum otherwise (Figs. 55, 59, 67) 6
6(5). Epigynum in ventral view with a median lobe arising from below posterior margin (Figs. 59–61); Mexico (Map 2D) ..... *ocosingo*
– Epigynum with median lobe arising from posterior of ventral plate (Figs. 55, 67) 7
7(6). Epigynum with median lobe about as wide as long (Fig. 67), posterior median plate a distinct sclerite (center of Fig. 68); central Mexico (Map 2D) ..... *apatzingan*
– Epigynum with median lobe wider than long (Fig. 55); posterior median plate an indistinct unbordered area (Fig. 56); Pernambuco, Brazil (Map 2A) ..... *buique*

KEY TO MALE *MECYNOGEA*

1. Proximal branch of terminal apophysis of palpus almost circular, covering most of palpus in mesal view (Fig. 32); Minas Gerais, to Argentina and Chile (Map 2B) ..... *erythromela*
– Both branches narrow (Figs. 21, 24, 38, 53, 65, 71, 77) 2
2(1). Distal branch of terminal apophysis in mesal view wider than proximal branch (Fig. 77); Cuba, Hispaniola (Map 2D) ..... *martiana*
– Branches of similar width, or distal one narrower in mesal view (Figs. 21, 38, 53, 63, 65, 71) 3
3(2). Proximal branch with a deep notch on upper side, bordered by a lip (Fig. 53); Maryland to Missouri, United States to northern Argentina (Map 2A) ..... *lemniscata*
– Proximal branch without notch (Figs. 21, 38, 63, 65, 71) 4
4(3). Proximal branch distally rounded (Fig. 63); Depto. Meta, Colombia (Map 2D) ..... *chavona*
– Proximal branch pointed at end (Figs. 21, 38, 63, 71) 5
5(4). Median apophysis with spine (at 4h in Figs. 63, 71, below center of Figs. 64, 72) 6
– Without median apophysis (Figs. 21, 22, 38, 39) 7
6(5). In mesal view, distal branch of terminal apophysis with a distal depression (at 2h in Fig. 71); central Mexico (Map 2D) ..... *apatzingan*
– In mesal view, distal branch of terminal apophysis curved out (at 2h in Fig. 63); Mexico (Map 2D) ..... *ocosingo*
7(5). Thread-shaped embolus showing between two branches (Fig. 21, E in Fig. 24); southeastern Brazil, Uruguay (Map 2C) ..... *bigibba*
– Embolus not visible between branches of terminal apophysis (Fig. 38); Venezuela to Mato Grosso, Brazil (Map 2A) ..... *sucre*

Mecynogea bigibba Simon
Plate 1A; Figures 1–25; Map 2C

Mecynogea bigibba Simon, 1903: 25. Female holotype from Goyaz [Goiânia, Goias state], Brazil, in MNHN, examined. Roewer, 1942: 747. Bonnet, 1957: 2745.

Wixia infelix Soares and Camargo, 1948: 378. Female from Chavantina, Mato Grosso, Brazil, in MZSP no. 1300, examined. Brignoli, 1983: 281. NEW SYNONYMY.

Description. Female from São Paulo, Brazil. Coloration as in other species, but more contrasting (Figs. 15–17). Total length 7.2 mm. Carapace 2.9 mm long, 2.3

Map 2. Distribution of *Mecynogea* species.

wide in thoracic region, 1.1 wide behind posterior median eyes. First femur 4.0 mm, patella and tibia 4.2, metatarsus 3.5, tarsus 1.2. Second patella and tibia 3.2 mm, third 2.1, fourth 3.1.

Male from Rio de Janeiro. Coloration as in female. Total length 7.7 mm. Carapace 3.5 mm long, 2.5 wide in thoracic region, 1.1 wide behind posterior median eyes. First femur 5.6 mm, patella and tibia 5.8, metatarsus 5.7, tarsus 1.6. Second patella and tibia 4.5 mm, third 2.5, fourth 4.3.

Note. Males and females were collected together.

Variation. Total length of females 6.3 to 11.6 mm, males 4.8 to 7.7. The specimens illustrated in Figures 1–6 and 18–25 were from the São Paulo Botanical Gardens; Figures 7–9 from Espírito Santo; Figures 10–12 from Minas Gerais; and Figures 13 and 14 from Mato Grosso. It is assumed they are all one species, which can only be ascertained by finding males.

Diagnosis. Mecynogea bigibba females are distinguished from others by not showing slit-shaped openings into the ducts in ventral view of the epigynum; the slits are hidden underneath the lateral plates (Figs. 5, 8, 11, 14). Also, the epigynum has a hump in profile (Figs. 6, 9), and in posterior view the floor of the cavity has a bulge (center of Figs. 5, 8). The male of *M. bigibba* is distinguished from others by showing the thread-shaped embolus in the space between the two branches of the terminal apophysis (Fig. 21, E in Fig. 24) and by the wide distal branch as seen in ventral view (Fig. 22).

Natural History. Specimens were found in shrubbery close to a pond in São Paulo (Plate 1A).

Distribution. Southeastern Brazil, Uruguay (Map 2C).

Specimens Examined. BRAZIL *Minas Gerais:* Diamantina, 2 imm., 1♀, doubtful determination (MNRJ); Minas de Serrinha, Diamantina, Feb., Mar. 1945, 1♀ (E. Cohn, AMNH). *Espírito Santo:* M. Moscoso, Vitória, Oct. 1981,1♀ (A. Cerrutti, MNRJ). *Rio de Janeiro:* Sumare, Cidade Rio de Janeiro, Feb. 1946, 3♀ (H. Sick, AMNH); Grumari, Rio de Janeiro, Dec. 1970–Jan. 1971, 2 imm., 1♂ (D. McGrath, S. M. Camazine, MCZ). *São Paulo:* Jardim Botânico, 9,10 Mar. 1985, 3♀ (H., L. Levi, MCZ); Embú, 9,10 Feb. 1974, 1♀ (F. Lane, MZSP 4897); São Roque, 7 Mar. 1976, 1♀ (F. Lane, MZSP 11521). *Rio Grande do Sul:* Canoas, 24 Jan. 1991, 1♂ (M. A. L. Marques, MCN 20456); Cerro Claro, São Pedro do Sul, 11 Jan. 1985, 6♀, 2♂ (A. A. Lise, MCN 12921); Cordilheira Cachoeira do Sul, 30 Dec. 1993, 1♂ (R. G. Buss, MCP 4382); Montenegro, 1 July 1977, 12 imm., 3♀, 5♂ (H. Bischoff, MCN 7480); Parque Florestal Estadual de Nonoai, Nonoai, 14 Jan. 1985, 1♀ (A. A. Lise, MCN 12812); São Leopoldo, 28 Nov. 1965, 3 imm., 1♂ (C. Valle, MZSP 4897); Sobradinho, 10 Jan. 1985, 11 imm., 2♀, 2♂ (A. A. Lise, MCN 12884); Tenente Portela, 29 Nov. 1978, 1 imm, 1♀ (H. Bischoff, MCN 8426); Triunfo, 12 Jan. 1989, 1♀ (A. B. Bonaldo, MCN 18081); Viamão, Aquas Belas, 29 Dec. 1976, 1 imm., 1♂ (A. A. Lise, MCN 5862). URUGUAY Piriapolis, 10 Dec. 1966, 1♀ (R. M. Capocasale, L. Bruno, CAS).

Mecynogea erythromela (Holmberg) Figures 26–33; Map 2B

Zilla erythromela Holmberg, 1876: 80. Female specimen from Las Conchas, Argentina [Partido de Tigre, Prov. Buenos Aires, 34°25′S, 58°34′W (Paynter, 1995: 405)], lost. First placed in *Mecynogea* by Mello-Leitão, 1933: 33.

Mecynogea tucumana Simon, 1903: 25. Female holotype from Tucumán, Argentina, in MNHN, examined. Roewer, 1942: 747. Bonnet, 1957: 2745. NEW SYNONYMY.

Gea bimucronata Mello-Leitão, 1936: 125, fig. 14, ♀. Female from Constitutión, Maule, Chile, in MNRJ.

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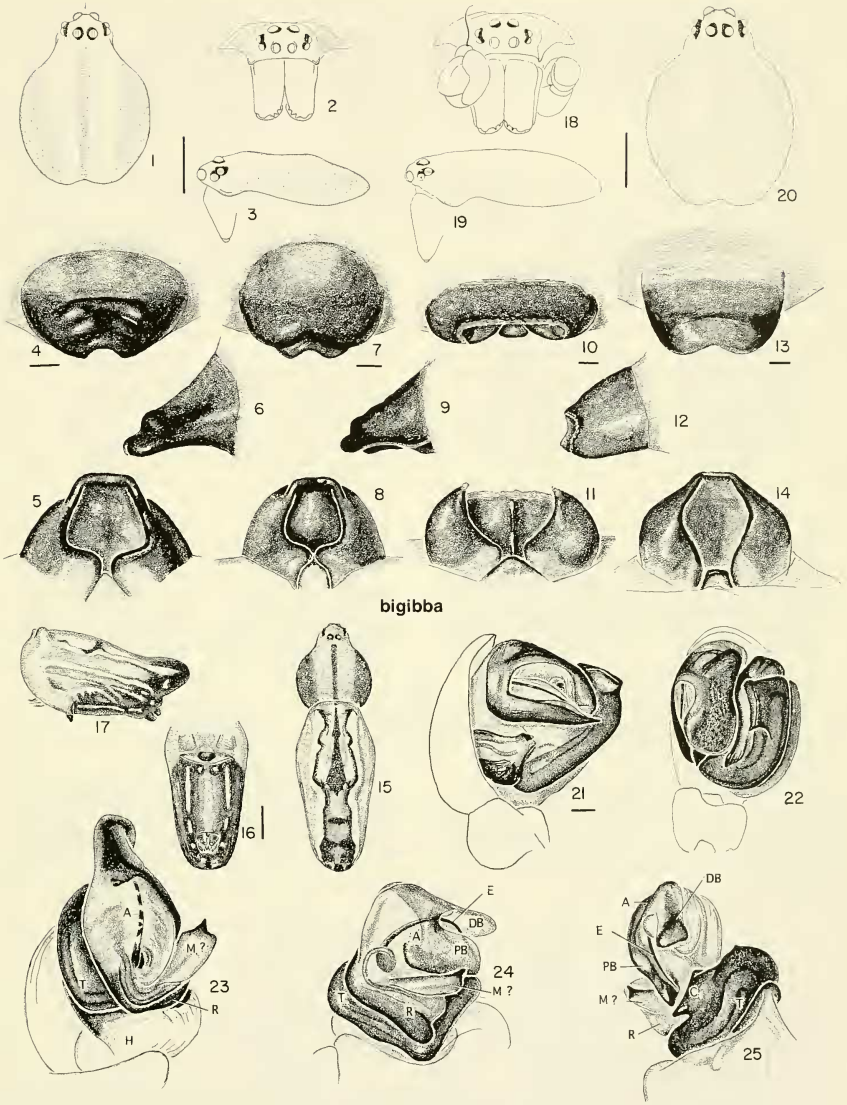
Figures 1–25. *Mecynogea bigibba* Simon. 1–17, female. 1, carapace; 2, eye region and chelicerae; 3, carapace and chelicera, lateral. 4–14, epigynum. 4, 7, 10, 13, ventral; 5, 8, 11, 14, posterior; 6, 9, 12, lateral. 4–6, (from São Paulo); 7–9, (from Espírito Santo); 10–12, (from Minas Gerais); 13, 14, (from Mato Grosso). 15, dorsal; 16, abdomen, ventral; 17, abdomen, lateral. 18–25, male. 18, eye region, chelicerae and right palpus; 19, carapace and chelicera, lateral; 20, carapace. 21–25, left male palpus. 21, mesal; 22, ventral; 23, expanded, subdorsal; 24, expanded, submesal; 25, expanded, subventral.

Abbreviations. A, terminal apophysis; C, conductor; DB, distal branch of terminal apophysis; E, embolus; H, hematodocha; M, median apophysis; PB, proximal branch of terminal apophysis; R, radix; T, tegulum.

Scale lines: genitalia 0.1 mm; others 1.0 mm.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examined. Roewer, 1942: 746. Bonnet, 1957: 1982. NEW SYNONYMY.

Mangora bituberculata Mello-Leitão, 1939: 63, figs. 34–37, ♂. Male from Paraguay, in NMB, examined. Roewer, 1942: 774. Bonnet, 1957: 2708. NEW SYNONYMY.

Mecynogea erythromela:—Roewer, 1942: 747. Bonnet, 1957: 2745.

Allepeira donosoi Archer, 1963: 17.

Note. Holmberg (1876) noted that he had only a poorly preserved female. His description of the closely spaced eyes, size and wavy abdominal bands fit this species; the description of the black and red color is less accurate; but a dry specimen may have been more red than the orange coloration noted in other descriptions. Simon's description lacked illustrations. The illustrations of *Gea bimucronata* are poor; those of *Mangora bituberculata* are of the male not previously associated with this species. Specimens and a citation of this species from Chile were labeled *Allepeira donosoi* by Archer, but no description has been found in the literature.

Description. Female from Mendoza. Coloration as in other species, dorsal abdominal bands relatively wide and less distinct. Total length 6.6 mm. Carapace 2.3 mm long, 1.7 wide in thoracic region, 0.7 wide behind median eyes. First femur 3.3 mm, patella and tibia 3.4, metatarsus 2.9, tarsus 1.2. Second patella and tibia 3.0 mm, third 1.8, fourth 2.7.

Male from Mendoza. Coloration as in female, but less distinct. Total length 3.8 mm. Carapace 1.7 mm long, 1.2 wide in thoracic region, 0.7 wide behind posterior median eyes. First femur 2.7 mm, patella and tibia 2.8, metatarsus 2.7, tarsus 1.0. Second patella and tibia 2.5 mm, third 1.2, fourth 2.0.

Note. Males and females were collected together.

Variation. Total length of females 5.6 to 7.5 mm, males 3.7 to 5.7. As in other *Mecynogea* species, there is considerable variation in the structure of the epigynum. The lateral plates, in posterior view, are long in Argentinean specimens (Fig. 27), shorter in females from Chile (Fig. 30).

Figures 26–28 were made from female holotype of *M. tucumana*, Figures 32 and 33 from a male from Mendoza, Argentina, and Figures 29 and 30 from the holotype of *Gea bimucronata* from Chile.

Diagnosis. Females of *M. erythromela* differ from other species by having the cavity of the epigynum hood with a median, longitudinal groove and expanding dorsally into the raised median plate (at 6h in Figs. 27, 29). The round terminal apophysis covering most of the palpus readily distinguishes males (Fig. 32).

Natural History. The collecting sites in Mendoza and in Santiago del Estero were in dry, chaparral-like shrubbery.

Distribution. Minas Gerais, Brazil, to Argentina and Chile (Map 2B).

Specimens Examined. BRAZIL *Mato Grosso:* Poconé, 4–10 Aug. 1992, 1♀ (A. A. Lise, G. A. Beaul, MCP). *Minas Gerais:* Reserva Ecológica do Parga, Uberlandia, 1 Sept. 1989, 1♂ (C. M. L. Ribeiro, MCP 1147). PARAGUAY *Concepción:* Territ. Fonciere [Fonciere], 1908, 2♀, 1♂ (E. Reimoser, MCZ). ARGENTINA *Santiago del Estero:* 70 km W Santiago, 3 Apr. 1965, 1♀, 1♂ (H. Levi, MCZ); Santiago del Estero, 2 Apr. 1965, 1♂ (H. Levi, MCZ). *Tucumán:* Tucumán, 1–15 May 1950, 3♀ (M. L. Aczél, AMNH); Cord. Valle Hermoso, Feb. 1958, 1♀ (O. de

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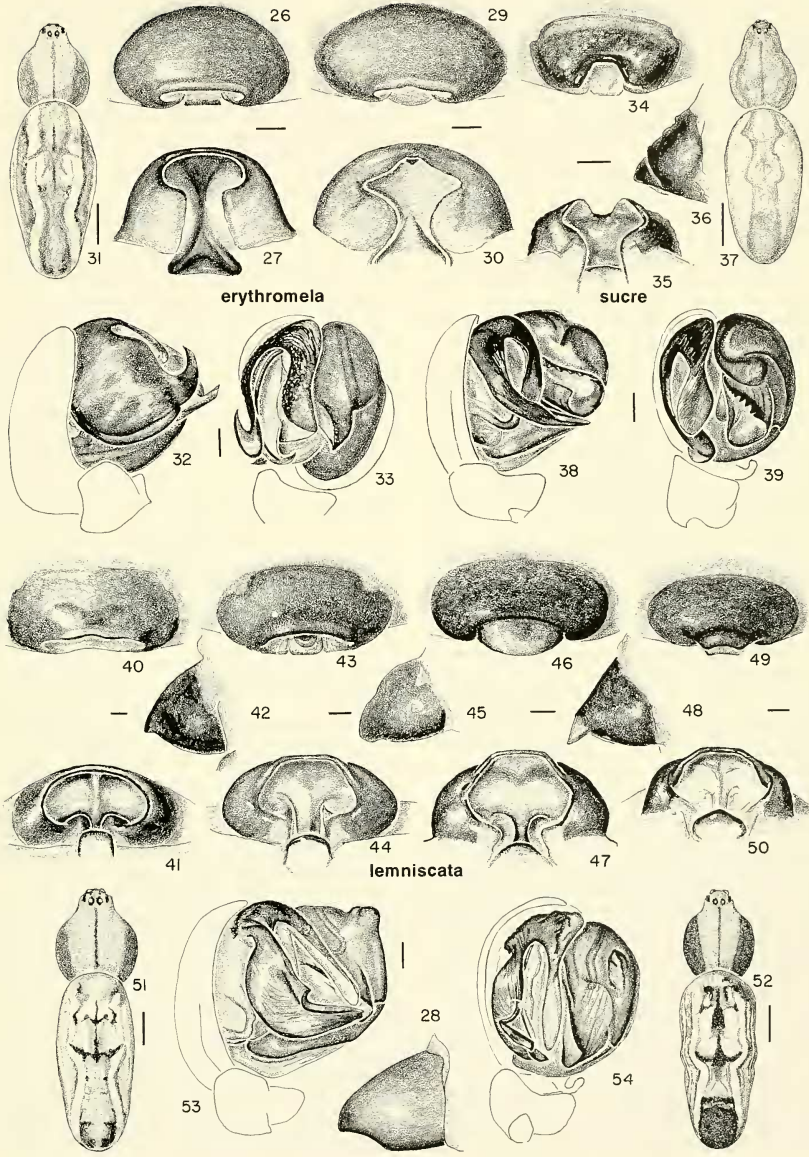
Figures 26–33. *Mecynogea erythromela* (Holmberg). 26–31, female. 26–30, epigynum. 26, 29, ventral; 27, 30, posterior; 28, lateral. 26–28, (from Argentina); 29–30, (from Chile). 32, 33, left male palpus. 32, mesal; 33, ventral.

Figures 34–39. *M. sucre* new species. 34–37, female. 34–36, epigynum. 34, ventral; 35, posterior; 36, lateral. 37, dorsal. 38, 39, male palpus. 38, mesal; 39, ventral.

Figures 40–54. *M. lemniscata* (Walckenaer). 40–52, female. 40–50, epigynum. 40, 43, 46, 49, ventral; 41, 44, 47, 50, posterior; 42, 45, 48, lateral. 40, 41, (from Panama); 43, 44, (from Venezuela); 46–48, (from Distrito Federal, Brazil); 49, 50, (from Argentina). 51, 52, dorsal. 51, (from Venezuela). 52, (from Argentina). 53, 54, male palpus. 53, mesal; 54, ventral.

Scale lines: genitalia 0.1 mm; others 1.0 mm.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lemniscata
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Ferraris, AMNH). *La Rioja:* Cuesta de Miranda, Jan. 1964, 1♀, 1♂ (M. E. Galiano, MACN); Patquía, Jan. 1964, 1♀ (M. E. Galiano, MACN). *Córdoba:* Valle Hermoso, Feb. 1958, 1♀ (C. de Ferraris, AMNH). *Mendoza:* Mendoza, 900 m, Feb. 1908, 2♀ (E. Reimoser, MCZ); 30–31 Mar. 1965, 2 imm., 5♀, 1♂ (H. Levi, MCZ); Depto. Luján, S km SSW Estación Cachenta, 1500 m, Apr. 1958, 1♀ (B. Patterson, MCZ); Las Heras, 7 km W Mendoza, 1200 m, Mar., Apr. 1958, 5♀ (B. Patterson, MCZ). *Neuquén:* Butaco [21 km N Buta Ranquil], Jan. 1975, 3 imm., 1♀, 1♂ (E. Maury, MACN). *Río Negro:* Coronel Juan F. Gómez, Nov. 1945, 1♀ (I. Crasso, MLP). CHILE *Región III de Atacama:* Copiapó Sector, María Isabel, 6 Feb. 1982, 4♀, 11♂ (J. Moreno, AMNH). *Región IV de Coquimbo:* Fundo Tahuinco, Depto. Salamanca, 1 May 1961, 1♀ (A. F. Archer, AMNH). *Región Metropolitana:* Alhué, July 1947, 1♂ (L. Peña, IRSNB); Santiago, 17 Dec. 1988, 3♀, 1♂ (B., V. Roth, CAS). *Región VI del Libertador Gral. Bernardo O'Higgins:* Fundo Millahue Cmaco, Colchacua, 25 Mar. 1961, 2♀ (Donoso, A. F. Archer, AMNH). *Región VII de Maule:* Talco, 2♀ (MNRJ); Llico, 5♀ (L. Peña, IRSNB). *Región VIII del Bío-Bío:* Nueva Aldea, 10 Jan. 1976, 10♀, 4♂ (G. Moreno, AMNH).

Mecynogea sucre new species
Figures 34–39; Map 2A

Holotype. Male holotype and female paratype from 7 km E of San Antonio del Golfo, Sucre, Venezuela, 23 Mar. 1982 (G. F., J. F. Hevel), in USNM. The specific name is a noun in apposition after the locality.

Description. Female paratype. Carapace yellowish with black pigment, poorly preserved. Abdomen banded (Fig. 37) but with little black pigment; venter with a pair of white lines, broken into three parts, anterior longest, posterior shortest, black only outside their border. Height of clypeus equals 0.4 diameter of anterior median eye. Total length 5.6 mm. Carapace 2.0 mm long, 1.4 wide in thoracic region, 0.8 wide behind posterior median eyes. First femur 2.7 mm, patella and tibia 2.6, metatarsus 2.3, tarsus 0.9. Second patella and tibia 2.3 mm, third 1.4, fourth 2.3.

Male holotype. Carapace with median black line, only little black pigment on sides of thoracic region. Coloration as in female. Height of clypeus equals 0.4 diameter of anterior median eye. Total length 4.3 mm. Carapace 1.9 mm long, 1.5 wide in thoracic region, 0.7 wide behind posterior median eyes. First femur 2.6 mm, patella and tibia 2.9, metatarsus 2.6, tarsus 0.1. Second patella and tibia 2.6 mm, third 1.4, fourth 2.3.

Note. Males and females were collected together.

Variation. Total length of females 5.5 to 5.7 mm. The illustrations were made from holotype and female paratypes.

Diagnosis. The notch on the posterior margin of the epigynum hood (Figs. 34, 35) distinguishes the female from those of other species. The openings to the ducts are not visible in posterior view. The male is distinguished from others by having the long axis of the distal branch of the embolus branch almost parallel to the long axis of the cymbium, its tip covered by the proximal branch (Fig. 38).

Natural History. Specimens came from marsh-lake area in Bolívar state, Venezuela.

Distribution. Venezuela to Mato Grosso, Brazil (Map 2A).

Specimens Examined. VENEZUELA *Bolívar:* 40 km N Guasipati, 22 Mar. 1982, 1 imm., 1♀, 1♂ (G. F., J. F. Hevel, USNM). BRAZIL *Mato Grosso:* 260 km N Xavantina, 12°49′S, 51°46′W, 400 m, Feb., Apr. 1969, 1♀ (Xavantina-Cachimbo Expedition, MCZ).

Mecynogea lemniscata (Walckenaer)
Figures 40–54; Map 2A

Linyphia lemniscata Walckenaer, 1841: 263. Name for illustration fig. 25, j, Abbot, 1792, The Insects of Georgia in America, in BMNH. Photocopy in MCZ, examined.

Argiope trivittata O. P.-Cambridge, 1889: 51, pl. 4, fig. 5, ♂ [not fig. 6, ♀]. Syntypes from Dolores [?], Sacrixpur [?], betw. Dolores and Chapallal [?] and San José River nr. Chiquimuh [Chicimula], Guatemala, in BMNH. Male lectotype, designated by F. P.-Cambridge, 1904: 523, not female paralectotypes. NEW SYNONYMY.

Epeira basilica McCook, 1878: 133, figs. 1–3, ♀. Lectotype from Austin River, Texas, designated by Levi (1980).

Hentzia trivittata:—F. P.-Cambridge, 1904: 523, pl. 51, fig. 12, ♂ [not fig.13, ♀]. Bonnet, 1957: 2157.

Allepeira basilica:—Roewer, 1942: 778.

Allepeira trivittata:—Roewer, 1942: 778.

Cea wiedenmeyeri Schenkel, 1953: 17, fig. 15, ♀. Female holotype from Pozón, Prov. Falcón, Venezuela, in NMB, examined. Brignoli, 1983: 244. NEW SYNONYMY.

Allepeira affinitata Kraus, 1955: 26, figs. 54–56, ♀,

♂. Male holotype from El Salvador, in SMF, examined. Synonymized by Levi (1980).
Hentzia basilica:—Bonnet, 1957: 2157.
Mecynogea lemniscata:—Levi, 1980: 13, pl. 1, figs. 1–15, ♀, ♂.
Mecynogea affinitata:—Brignoli, 1983: 274.

Description. Female holotype of *M. wiedenmeyeri.* Coloration as in others, but anterior of dorsum of abdomen lighter and less distinctly marked (Fig. 51). Total length 7.9 mm. Carapace 3.3 mm long, 2.5 wide in thoracic region, 1.3 wide behind posterior median eyes. First femur 4.6 mm, patella and tibia 4.7; metatarsus , tarsus lost. Second patella and tibia 4.0 mm, third 2.5, fourth 4.0.

Male. From Garruchos, Rio Grande do Sul, Brazil. Coloration as in female (Figs. 51, 52). Total length 6.0 mm. Carapace 2.6 mm long, 1.9 wide in thoracic region, 0.9 wide behind posterior median eyes. First femur 3.8 mm, patella and tibia 4.2, metatarsus 3.9, tarsus 1.4. Second patella and tibia 3.9 mm, third 2.0, fourth 3.1.

Variation. Total length of females 7.5 to 10.5 mm, males 4.5 to 7.3. The shape of the hood openings are variable. Figures 40–42, were made from a female from Panama; Figures 43–45, from the holotype of *Gea wiedenmeyeri* from Venezuela; Figures 46–48 and 51 from a female from Distrito Federal, Brazil; Figures 49, 50 and 52 a female from Argentina; and Figures 53 and 54 from a male from Yucatán, Mexico.

Diagnosis. The openings to the ducts in the epigynum are in slits within the hood opening, ventral and median to the lateral plates (at 4h and 6h in Figs. 41, 44, 47, 50), those of *M. bigibba, M. erythromela* and *M. sucre* are hidden underneath the lateral plates (Figs. 8, 27, 35). In *M. lemniscata,* unlike *M. erythromela,* the cavity has a longitudinal, median ridge (Figs. 41, 50). The notch with a lip on the distal surface of the proximal branch of the terminal apophysis (Fig. 53) readily distinguished the male from those of other species.

Distribution. Maryland to Missouri, United States, to northern Argentina (Map 2A). The map includes data from Levi (1980).

Specimens Examined. BAHAMA ISLANDS *South Bimini:* July 1951, 1♂ (C., P. Vaurie, AMNH). LESSER ANTILLES *Trinidad:* Gasparee, 5 Nov. 1946, 1♀ (R. H. Montgomery, AMNH). *Curaçao:* Fuik (Oostpunt), 26 Dec. 1962, 1♂, fragments with palpus from mud dauber nest (H. Levi, B. de Jong, MCZ). MEXICO *San Luis Potosí:* Valles, 1961, 2♀, 1♂ (L. Steude, AMNH); 3 km W Pilares, 21 Oct. 1994, 1♀ (W. Piel, MCZ). *Durango:* Durango, 4 Aug. 1954, 1♂ (W. J. Gertsch, AMNH). *Campeche:* 6 km W Francisco Escarcega, El Tormento forest station, 11, 12 July 1983, 2♂ (W. Maddison, MCZ). *Yucatán:* Chichén Itzá, 1♀ (C. J. Goodnight, AMNH); 28 June 1975, 1♂ (W. Sedgwick, MCZ). *Quintana Roo:* Chetumal, 28 June 1975, 1♂ (W. Sedgwick, MCZ). PANAMA *Panamá:* Cerro Galero, 15 July 1985, 1♀ (W. Eberhard, MCZ); Fort Kobbe, 3 Aug. 1983, 1♀ (H., L. Levi, H. Stockwell, MCZ). VENEZUELA *Falcón:* Paraguana Península, ca. 6 km W Nuevo Pueblo, 26 Nov.–4 Dec. 1990, 1♀ (A. L. Markezich, MCZ). BRAZIL *Distrito Federal:* km 0 BR 251, 24 Jan. 1990, 1♀ (C. dall'Aglio, MCZ). *São Paulo:* São Paulo, Inst. Botânica, 10 May 1965, 1♀ (P. de Biasi, MZSP). *Rio Grande do Sul:* Barueri, 21, 22 Jan. 1961, 1♂ (MZSP 11522); Garruchos, São Borja, 6 Dec. 1975, 1 imm, 1♀, 1♂; 10 Dec. 1975, 1 imm., 2♂ (A. A. Lise, MCN 3190, 3270, 3265). PARAGUAY *Alto Paraná:* Taquarazapa [? Tacuara], 1♀ (AMNH). ARGENTINA *Santa Fé:* Las Gamas, 20 km W Vera, 25–27 Mar. 1995, 1♀ (M. Ramírez, P. Goloboff, C. Szumik, J. Faivovich, MACN).

Mecynogea buique new species
Figures 55–58; Map 2A

Holotype. Female holotype from between Catimbau and Buique, Pernambuco, Brazil, 20 Aug. 1982 (P. F. Lins Duarte), in MCN no. 25574. The specific name is a noun in apposition after the locality.

Description. Female holotype. Coloration as in other species, but abdomen with little black pigment dorsally, black pigment only in a pair of posterior black spots in the posterior dark area, other darker areas dorsally lack white pigment (Fig. 58). Total length 7.0 mm. Carapace 2.4 mm long, 1.8 wide in thoracic region, 0.9 wide behind posterior median eyes. First femur 3.3 mm, patella and tibia 3.4, metatarsus 2.9, tarsus 1.1. Second patella and tibia 2.9 mm, third 1.6, fourth 2.5.

Diagnosis. The epigynum of this species (Figs. 55–57) lacks a hood as in females of *M. ocosingo, M. apatzingan* and *M. mar-*

tiana. The epigynum differs from that of *M. ocosingo* in posterior view, having the median plate divided from the laterals by a straight seam (Fig. 56), whereas in *M. ocosingo*, the concave edges of the laterals overlap the median plate (Fig. 60).

Specimens Examined. No other specimens were found.

Mecynogea ocosingo new species
Figures 59–64; Map 2D

Holotype. Male holotype, one male and two female paratypes from Fortín, Veracruz, Mexico, 17 July 1991 (W. H. Piel, G. S. Bodner), in MCZ. The specific name is a noun in apposition after the locality of the first finding of this species.

Description. Female paratype. Coxae yellowish with brown patches. Legs yellowish, venter brown, dorsum of femora with dusky lines. Total length 9.2 mm. Carapace 3.9 mm long, 2.8 wide in thoracic region, 1.3 wide behind posterior median eyes. First femur 5.1 mm, patella and tibia 5.3, metatarsus 4.6, tarsus 1.5. Second patella and tibia 4.8 mm, third 2.7, fourth 4.4.

Male holotype. Total length 7.5 mm. Carapace 3.4 mm long, 2.5 wide in thoracic region, 1.1 wide behind posterior median eyes. First femur 5.0 mm, patella and tibia 5.0, metatarsus 4.9, tarsus 1.6. Second patella and tibia 4.4 mm, third 2.4, fourth 4.0.

Variation. Total length of females 9.0 to 9.3 mm.

Diagnosis. The epigynum of *M. ocosingo* differs from *M. buique* and *M. apatzingan* by having the median lobe emerge from underneath its posterior margin (Figs. 59, 61). The male palpus (Figs. 63, 64) differs from that of *M. apatzingan* by having the two branches of the terminal apophysis of a different shape and slightly smaller.

Natural History. Webs of this large species commonly were found below the webs of *Metepeira incrassata* F. P.-Cambridge (W. Piel, personal communication). One female was collected by beating dead limbs. The spiders have only one large eggsac rather than a string of them as in *M. lemniscata* (C. Hieber, personal communication).

Specimens Examined. MEXICO *San Luis Potosí:* W Xilitla, 10 Aug. 1991, 1♀ (W. H. Piel, G. S. Bodner, MCZ). *Veracruz:* Coscomátepec, 25 Aug. 1963, 1♀ (D. L., H. E. Frizzell, CAS). *Chiapas:* Finca El Real, Ocosingo Valley, 1–7 July 1950, 1♀ (C. and M. Goodnight, L. Stannard, AMNH).

Mecynogea chavona new species
Figures 65, 66; Map 2D

Holotype. Male holotype from Finca Chenevo, 20 km N Río Muco, 20 km S El Porvenir, ca. 170 m, Depto. Meta, Colombia, 1979 (W. Eberhard, no.1391), in MCZ. The specific name is an arbitrary combination of letters.

Description. Male holotype. Carapace orange-yellow without markings. Chelicerae, labium, sternum orange-yellow. Legs orange-yellow, proximal ends of third and fourth coxae brown. Abdomen with usual dorsal pattern; venter with a pair of white lines, each split into three parts. Total length 6.3 mm. Carapace 3.1 mm long, 2.5 wide in thoracic region, 1.1 wide behind posterior median eyes. First femur 4.6 mm, patella and tibia 5.1, metatarsus 4.7, tarsus 1.6. Second patella and tibia 4.2 mm, third 2.5, fourth 4.0.

Diagnosis. The wide proximal branch of the terminal apophysis (Fig. 65) distinguishes the male from that of *M. sucre* (Fig. 38). In both species the tip of the distal branch is covered by the proximal branch.

Specimens Examined. Two imm. from type locality (W. Eberhard, MCZ).

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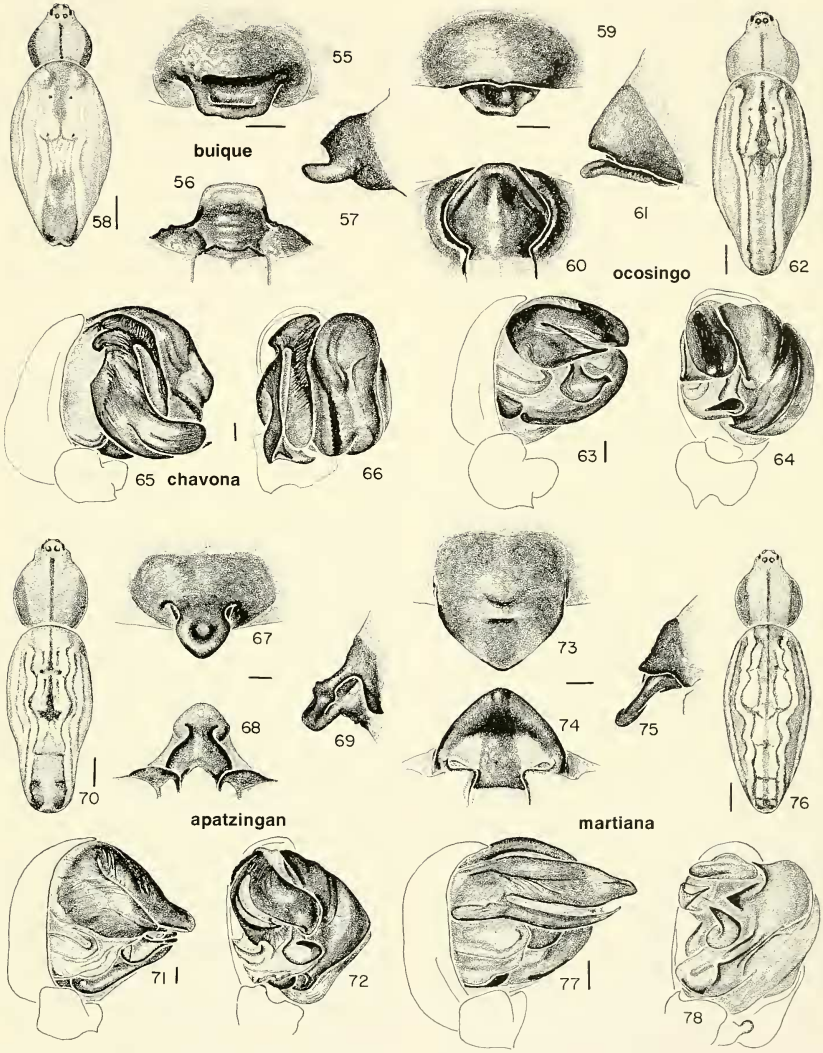
Figures 55–58. *Mecynogea buique* new species, female. 55–57, epigynum. 55, ventral; 56, posterior; 57, lateral. 58, dorsal.

Figures 59–64. *M. ocosingo* new species. 59–62, female. 59–61, epigynum. 59, ventral; 60, posterior; 61, lateral. 62, dorsal. 63, 64, male left palpus. 63, mesal; 64, ventral.

Figures 65, 66. *M. chavona* new species, male palpus. 65, mesal; 66, ventral.



Figures 67–72. *M. apatzingan* new species. 67–70, female. 67–69, epigynum. 67, ventral; 68, posterior; 69, lateral. 70, dorsal. 71, 72, male palpus. 71, mesal; 72, ventral.

Figures 73–78. *M. martiana* (Archer). 73–76, female. 73–75, epigynum. 73, ventral; 74, posterior; 75, lateral. 76, dorsal. 77, 78, male palpus. 77, mesal; 78, ventral.

Scale lines: genitalia 0.1 mm; others 1.0 mm.

Mecynogea apatzingan new species
Figures 67–72; Map 2D

Holotype. Female holotype from Apatzingán, Michoacán, Mexico, 1,200 ft elev. [370 m], July, Aug. 1941 (H. Hoogstraal), in MCZ. The specific name is a noun in apposition after the locality.

Description. Female holotype. Venter of abdomen with long pair of white lines enclosing another shorter pair. Total length 9.6 mm. Carapace 3.5 mm long, 2.8 wide in thoracic region, 1.3 wide behind posterior median eyes. First femur 4.2 mm, patella and tibia 4.6, metatarsus 3.5, tarsus 1.2. Second patella and tibia 4.1 mm, third 2.5, fourth 4.0.

Male from Cocoyoc, Morelos. Coloration as in female. Total length 7.1 mm. Carapace 3.3 mm long, 2.4 wide in thoracic region, 1.2 wide behind posterior median eyes. First femur 4.7 mm, patella and tibia 5.0, metatarsus 4.7, tarsus 1.7. Second patella and tibia 4.5 mm, third 2.4, fourth 4.0.

Note. Males and females were collected together.

Variation. Total length of females 8.2 to 10.1 mm. Some females have the posterior lobe of epigynum with a neck (Fig. 67); others lack the constriction. The illustrations were made from the female holotype and several other specimens, and the male from Cocoyoc, Morelos.

Diagnosis. The epigynum (Fig. 67) resembles that of *Alpaida gallardoi* Levi (Levi, 1988: 431, fig. 300). The equal length and width of the posterior lobe of the epigynum (Fig. 67) and the neck of the median plate in posterior view (Fig. 68) distinguish this species from all other *Mecynogea*. The male is also readily distinguished from other species: in mesal view of the palpus the proximal branch of the terminal apophysis overlaps the length of the distal branch and no space is visible between the branches (Fig. 71).

Natural History. The holotype was taken by sweeping shrubs in semi-desert scrub area.

Specimens Examined. MEXICO *Morelos:* Yautepec, 13 Aug. 1954, 3♀ (R. Dreisbach, MCZ); Cocoyoc, 27 July 1956, 2 imm., 2♀, 2♂ (W. J. Gertsch, V. Roth, AMNH); Cuernavaca, Oct. 1944, 2♀ (N. L. H. Krauss, AMNH); SW Puente de Ixtla, 14 Oct. 1994, 1♀ (W. H. Piel, MCZ). *Puebla:* Acatlán, 24–27 Sept. 1946, 2♀ (H. Wagner, AMNH); 19 km N Acatlán, 3 July 1947, 1♀ (L. I., A. M. Davis, AMNH); Matamoros, 4 Sept. 1945, 1♀ (H. Wagner, AMNH).

Mecynogea martiana (Archer)
Figures 73–78; Map 2D

Allepeira martiana Archer, 1958: 6, figs. 12, 13, 26, ♀, ♂. Male holotype from Carretera Monserrate, Matanzas Prov., Cuba, (P. Alayo), in AMNH, examined.

Mecynogea martiana:—Brignoli, 1983: 274.

Description. Female paratype. Coloration as in other species. Total length 8.8 mm. Carapace 2.8 mm long, 2.4 wide in thoracic region, 1.1 wide behind posterior median eyes. First femur 3.9 mm, patella and tibia 3.8, metatarsus 3.4, tarsus 1.15. Second patella and tibia 3.5 mm, third 1.9, fourth 3.2. All femora slightly longer than patella and tibia of same leg.

Male holotype. Coloration as in female. Total length 5.7 mm. Carapace 2.4 mm long, 2.0 wide in thoracic region, 0.8 wide behind posterior median eyes. Third femur 2.1 mm, fourth 3.4; other leg articles missing.

Diagnosis. The epigynum of *M. martiana* is a triangular sclerite having a shallow, transverse, ventral groove (Fig. 73) unlike that of any other *Mecynogea* species. The male, unlike most other *Mecynogea* species has the distal branch of the terminal apophysis wider than the proximal one (Fig. 77). It differs from *M. bigibba* (Fig. 21) in having the narrow space between the two branches with almost parallel sides (Fig. 77).

Natural History. Both females collected had their webs in agave plants.

Specimens Examined. HAITI Port au Prince, 18–21 July 1955, 4♀ paratypes (A. F. Archer, AMNH). DOMINICAN REPUBLIC Barahona, Sierra Martín García, 8 Aug. 1958, 1♀ (A. F. Archer, E. de Boyroe Moya, AMNH).

Manogea new genus

Type Species. Miranda porracea C. L. Koch, 1839. The name is an arbitrary combination of letters attached to *Gea*. The gender of the name is feminine.

Diagnosis. Manogea differs from all araneids except *Argiope, Gea, Mecynogea, Kapogea* and *Cyrtophora* by having the posterior median eye row straight (*M. porracea* in Fig. 79) or procurved (*M. gaira* and *M. triforma* in Figs. 97, 103). *Manogea* females differ from *Kapogea* and *Cyrtophora* by having a narrow cephalic region (Fig. 79) and slender legs, the first patella and tibia being about 10 times as long as the width of the tibia, whereas in *Kapogea* it is only 6 to 7 times. *Manogea* differs from *Argiope* and *Gea* by having the abdomen tubular to oval, with an anterior pair of tubercles (Figs. 85, 97, 103; 1 in Table 1).

Manogea differs from *Mecynogea* by the pattern on the abdomen: dorsal, straight longitudinal bands that fade anteriorly (Figs. 85, 97, 103). In *Mecynogea* the bands have a wave in the center of the abdomen (Fig. 15). The epigyna in *Manogea* have a pair of openings, each anterior to a cup-shaped structure ([7] in Table 1), sclerotized in *M. porracea* (Figs. 82–84), soft in *M. triforma* and *M. gaira* (Figs. 94, 100). The male palpus lacks the biforked terminal apophysis of *Mecynogea* (Figs. 21, 24); instead there is a distal, soft terminal apophysis (A in Fig. 93), and a small, soft median apophysis (M in Fig. 93).

Description. Females. Coloration (Figs. 85, 97, 103) similar to that of *Mecynogea* (Fig. 15). Anterior median eyes slightly largest, anterior laterals smallest, posterior eyes intermediate (Figs. 79, 88). Eyes of anterior row equally spaced, or median eyes slightly closer to laterals. Posterior eyes equally spaced (Figs. 79, 88). Eye quadrangle wider in front than behind, slightly longer than wide in front (Figs. 79, 80, 87, 88). Clypeus equals about 0.6 diameter of anterior median eyes (Figs. 80, 87). Unlike most other American araneids, but like *Argiope, Mecynogea* and *Kapogea*, all femora are about equal in length to combined patella and tibia of same leg, or the first femur may be slightly shorter. Also, combined metatarsi and tarsi are longer than combined patella and tibia of same leg. In most other araneids, femora are shorter than the patella and tibia, and metatarsi and tarsi are shorter than patella and tibia of the same leg.

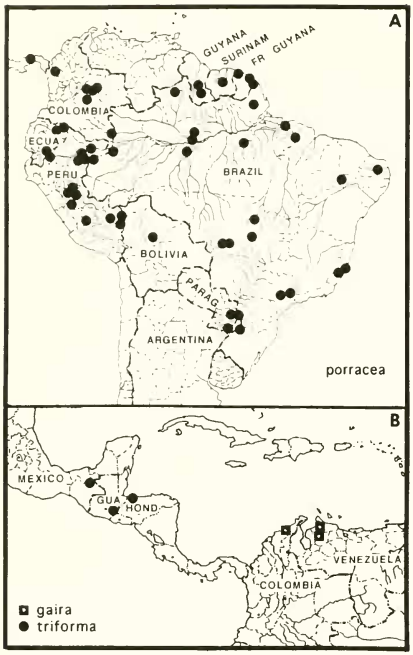
Males. Anterior eyes slightly closer to laterals than to each other (Fig. 88); otherwise similar to females. *Manogea porracea* has a tooth on the endite; other species lack the tooth. All species with one macroseta on palpal patella and two on palpal tibia (Fig. 98). All lack hook on first coxa. Length of males about half to three-quarters that of females.

Genitalia. The epigynum has the paired duct openings anterior to a pair of cup-shaped structures, which are sclerotized, adjacent and posterior in *M. porracea* (Figs. 82–84), soft and lateral in *M. triforma* (Figs. 94–96) and *M. gaira* (Figs. 100–102).

The palpi in all three species are weakly sclerotized. *Manogea porracea* has a weakly sclerotized embolus (E in Fig. 93), a soft median apophysis (M), and a pointed conductor (C) sitting on the tegulum where one might expect a median apophysis. The distal position of the median apophysis resembles that of *Kapogea*. Rarity of male specimens of *M. triforma* and *M. gaira* made study of their palpi difficult. *Manogea gaira* has a long thread-shaped embolus (Figs. 105, 106) that breaks when mating; the distal part remains in the epigynum (Figs. 100, 101). Both *M. gaira* and *M. triforma* have a pointed conductor in the same position as that of *M. porracea*, and a soft median apophysis that extends from behind the radix (Figs. 98, 104).

Silk Glands. Manogea porracea has lost both aggregate and flagelliform silk glands (=*Mecynogea guianensis*:—Kovoor and Lopez, 1988), whereas *Mecynogea* has small aggregate glands.

Relationship. The similarity of *Manogea* to *Mecynogea* and *Kapogea* suggests that



Map 3. Distribution of *Manogea* species.

Manogea occupies an intermediate position.

Natural History. Manogea porracea constructs a web similar to those of *Mecynogea* species (Plate 1B).

Distribution. All three species are tropical American.

Separating Species. The species are readily distinguished by the structure of their genitalia.

KEY TO FEMALE *MANOGEA*

1. Epigynum with a pair of sclerotized, adjacent, cup-shaped structures on the posterior margin (Figs. 82–84); Panama to northern Argentina (Map 3A) ..... *porracea*
– Epigynum with cup-shaped structures soft and separated from each other (Figs. 94, 100); southern Mexico to Colombia and Venezuela (Map 3B) 2

2(1). Epigynum a rounded lobe with parallel sides and a cup-shaped structure on each side (Fig. 94); Central America (Map 3B) ..... *triforma*
– Epigynum a median rounded lobe, with pair of shallow notches on each side housing the cup-shaped structures (Fig. 100); northern Colombia and Venezuela (Map 3B) ..... *gaira*

KEY TO MALE *MANOGEA*

1. Embolus flat, wide at base with pointed tip, upper margin almost straight, lower curved, transverse near tip of palpus (Fig. 91, E in Fig. 93); Panama to northern Argentina (Map 3A) ..... *porracea*
– Embolus ribbon-shaped (Figs. 104–106) or not distinct (Figs. 98, 99); Central America, Colombia and Venezuela (Map 3B) 2

2(1). Embolus ribbon-shaped (Figs. 105, 106); northern Colombia and Venezuela (Map 3B) ..... *gaira*
– Embolus hidden and indistinct (Figs. 98, 99); Central America (Map 3B) ..... *triforma*

Manogea porracea (C. L. Koch) new combination

Plate 1B; Figures 79–93; Map 3A

Miranda porracea C. L. Koch, 1839: 49, fig. 368, ♀. Specimen from Brazil, in ZSM, destroyed in the Second World War. First placed in *Cyrtophora* by Simon, 1895a: 773.

Zilla guyanensis Keyserling, 1881: 554, pl. 16, fig. 5, ♂. Two female, two male and an immature syntypes from Cayenne, French Guyana, in PAN, examined. Keyserling, 1893: 301, pl. 15, fig. 222, ♂. Placed in *Cyrtophora* by Levi, 1986: 106. NEW SYNONYMY.

Cyrtophora grammica Simon, 1895b: 156. Female from Tarapoto, Río Mayo, Pebas, Peru, and Le Pará [Belém, Est. Pará], Brazil, in MNHN, examined. Roewer, 1942: 751, Bonnet, 1956: 1366. NEW SYNONYMY.

Zygiella guyanensis:—Roewer, 1942: 887. Bonnet, 1959: 5002.

Cyrtophora porracea:—Roewer, 1942: 751. Bonnet, 1956: 1368.

Mangora albostriata Mello-Leitão, nomen nudum. Determined specimens from Rio Xingú, Pará, Brazil, in MNRJ, examined.

?*Mecynogea carvalhoi* Mello-Leitão, 1944: 8. Female holotype from Barra do Tapirapé [Est. Mato Grosso], Brazil, in MNRJ, lost. Brignoli, 1983: 274. Doubtful. NEW SYNONYMY.

Mangora octolineata Caporiacco, 1947: 25; 1948: 659, fig. 67, ♂. Male holotype from British Guiana [Guyana], in MZUF, examined. Brignoli, 1983: 273. NEW SYNONYMY.

Mecynogea guianensis Mello-Leitão, 1948: 167, fig. 10, ♀. Female from Kutupakari [? Kurupukari],

Essequibo River, Guyana, in BMNH, examined. Brignoli, 1983: 273. NEW SYNONYMY.

Meta brasilica Soares and Camargo, 1948: 380, figs. 37–39, ♀. Female holotype from Chavantina, Mato Grosso, Brazil, in MZSP no. E 777, C 1228, examined. Brignoli, 1983: 230. NEW SYNONYMY.

Meta berlandi Caporiacco, 1954: 80, fig. 14, ♀. Female holotype from Charvein [French Guyana], lost (not in MNHN, MZUF). Brignoli, 1983: 230. NEW SYNONYMY.

Meta espiritosantensis Soares and Camargo, 1955: 578, figs. 4, 5, ♂. Male with both palpi lost from Rio São José, Municipio de Colatina, Est. Espírito Santo, Brazil, in MZSP no. E 458, C 1309, examined. Brignoli, 1983: 230. NEW SYNONYMY.

Mecynogea guianensis:—Levi, 1980: 13; Kovoor and Lopez, 1988.

Cyrtophora guianensis:—Levi, 1991: 179.

Note. Although the illustration lacks the dorsal longitudinal lines on the femora which are present in all *Mecynogea* and *Manogea*, Koch' s illustration and description match this species. Koch's illustration has the cephalic region of the carapace light, framed by dark bands along the lateral cephalic-thoracic depression. Most specimens do not have this coloration, but some specimens from the Amazon area do. Koch's illustration is not a species of *Mecynogea*, because *Mecynogea* are much less common than the species to which the name here is applied; also, all *Mecynogea* species have a median black line on the carapace (it may be indistinct or missing in *M. porracea*).

Keyserling had only a male of *Zilla guyanensis* from Cayenne, but two females, two males and an immature specimen are in the vial. The additional specimens were presumably added later. *Cyrtophora grammica* is an adult female, readily recognized. The specimen of *Mangora albostriata* appears to be a manuscript type, but the description might have been overlooked in an out of the way publication of Mello-Leitão. The holotype of *Mecynogea carvalhoi* is lost, but the size of the specimen described fits this species; also, *Mecynogea* species are much less common than *M. porracea* in the type locality area. The holotype of *Mecynogea guianensis* was examined, and Mello-Leitão provided an adequate silhouette of the epigynum.

The *Mangora octolineata* male holotype was examined; Caporiacco also provided an adequate illustration. The illustration of the epigynum of *Meta berlandi* Caporiacco is recognizable, although the holotype is lost. The *Meta brasilica* holotype was examined and found to be this species. The *Meta espiritosantensis* holotype lost both palpi; however, the markings and shape of the abdomen and illustrations provided are adequate to identify the species.

Description. Female from Brownsberg Reserve, Surinam. Carapace yellow-white with brownish gray sides and narrow median line (Fig. 79). Chelicerae light orange-yellow. Labium, endites brown. Sternum orange with brown rim. Coxae yellow-white, legs yellow-white, with a dorsal, longitudinal brown line on first and second femora; venter of all with dark rings. Abdomen brownish white with white lines and spots (Fig. 85); venter with a pair of white lines, each divided into three, the first the longest, the last a round patch (Fig. 86). Total length 5.2 mm. Carapace 1.9 mm long, 1.5 wide in thoracic region, 0.8 wide behind posterior median eyes. First femur 2.2 mm, patella and tibia 2.3, metatarsus 1.9, tarsus 0.9. Second patella and tibia 2.1 mm, third 1.3, fourth 1.9. First patella and tibia 8.2 times longer than widest region of tibia.

Male from Surinam. Coloration as in female, but dorsal abdominal pattern less distinct (Fig. 90). Tooth on endite. Abdomen as in female but lacks humps (Fig. 90). Total length 3.0 mm. Carapace 1.59 mm long, 1.21 wide in thoracic region, 0.54 wide behind the posterior median eyes. First femur 1.69 mm, patella and tibia 1.74, metatarsus 1.82, tarsus 0.70. Second patella and tibia 1.59 mm, third 0.92, fourth 1.50.

Note. Males and females are commonly collected together.

Variation. Total length of females 4.4 to 9.3 mm, males 2.7 to 4.8. The tip of the embolus (E in Fig. 93) is variable in shape,

sometimes blunt, at other times pointed. Sometimes the posterior eye row is slightly procurved. The illustrations were made from specimens from Brownsberg Reserve, Surinam, but were slightly modified on the basis of specimens from other parts of the range.

Diagnosis. *Manogea porracea* is readily distinguished from all other American araneids by both the epigynum, with its two dark cup-shaped, adjacent, sclerotized areas on its posterior margin (Fig. 82) and the palpus, with its characteristically shaped embolus and conductor and absence of sclerotized median apophysis (Figs. 91–93). The male, unlike males of other *Manogea* species, has a tooth on the endite. There is no such tooth in *Mecynogea* and *Kapogea* species.

Natural History. Specimens were collected in forested areas in Panama and interior of forests near Manaus, Brazil, and in campo grassland and cerrado shrub in Mato Grosso. The web is illustrated by Plate 1B. Eggsacs have a diamond-shaped outline.

Distribution. Panama to northern Argentina (Map 3A).

Specimens Examined. PANAMA *Panamá:* Pipe Line Road nr. Gamboa (MCZ); Carti Road, 600m (MCZ); Barro Colorado Island (MCZ); Maru Camp, Cerro Azul (MCZ). GUYANA Upper Essequibo River, (AMNH). SURINAM *Brokopondo:* Brownsberg Reserve, 4°50′N, 55°15′W (MCZ). FRENCH GUYANA *Cayenne:* Montagne de Kaw nr. Camp Caïmans, 4°33′N, 52°09′W (USNM); Mont Cabasson nr. Cayenne (MCZ). COLOMBIA *Meta:* Finca Cheveno, 20 km N Río Muco, 20 km S El Porvenir (MCZ); Lomalinda, 3°18′N, 73°22′W (MCZ); Hacienda Mozambique, ca. 15 km W Puerto López (MCZ); 6 km SW Puerto López (MCZ); Río Muco, 20 km N Carimagua (MCZ). *Antióquia:* Mutatá Cancheras (MCZ). *Amazonas:* Río Pira and Apaporis (CAS). ECUADOR *Sucumbíos:* Cuyabeno (MCZ, MECN). *Napo:* Río Coca, Río Napo (MCZ). *Morona-Santiago:* Los Tayos, 1,000 m, 3°06′S, 78°12′W (MCZ). PERU *Loreto:* Explorama Inn, NE Iquitos (FSCA); Campanuto Venodo (MUSM); Cocha Shinguito, 05°08′S, 74°45′W (MUSM); Jénaro Herrera, 04°45′S, 73°45′W (MUSM); Pithecia, 05°11′S, 72°42′W (MUSM); Río Samiria (AMNH). *Amazonas:* Alto Río Comaina, Puesto de Vigilancia (MUSM). *Huánuco:* Monson Valley, Tingo María (CAS); 69 km E Tingo María (CAS); Dantas-La-Molina, SW Puerto Inca, 09°38′S, 75°00′W (MUSM). *Ucayali:* Bosque Nacional A. von Humboldt (MUSM); Pangnana, Río Pachitea, 9°37′S, 74°56′W (MCZ). *Pasco:* Huancabamba, 10°10′S, 75°15′W (MUSM). *Madre de Dios:* 15 km E Puerto Maldonado, 12°33′S, 69°03′W (MUSM); Río Tambopata Reserve, 30 km SW Puerto Maldonado (CAS, MCZ); Zona Reservada de Manu, 11°58′S, 71°18′W (USNM); Zona Reservada Pakitza (MUSM). *Ayacucho:* Monterico (PAN). BRAZIL *Amapá:* Serra do Navio (MACN). *Roraima:* Maracá (INPA); Ilha de Maracá, Rio Uraricoera (MCN). *Amazonas:* Manaus (INPA); Ponta Negra, Manaus (MACN); Reserva Ducke, nr. Manaus (INPA, MCN, MCZ); Reserva da Campina, Manaus (MCP); 80 km N Manaus, 2°24′S, 59°52′W (MCZ); Reserv. Colosso (MCZ); Reserv. Km 41 (MCZ); Reserv. Cabo Frio (MCZ); Reserv. Florestal (MCZ); Reserv. Dimona (MCZ); Rio Autaz, Capiranga, Campina Santa Amelia (MRMS); Tabatinga (MCN). *Pará:* Aldeia Arucu, Igarape Gurupi Uma, 50 km E Canindé, Rio Gurupi (AMNH); Canindé, Rio Gurupi (AMNH). *Pernambuco:* Dois Irmãos (MCN). *Paraíba:* Rio Maputro, 16 km S Equador (AMNH). *Espírito Santo:* Reserva Florestal, Linhares (JVN); Rio São José (MZSP). *Mato Grosso:* Poconé (MCP); 260 km N Xavantina, 12°49′S, 51°46′W (MCZ); Chapada dos Guimarães (MCN, MCP); Chavantina (MZSP); Pantal (MCN). *São Paulo:* Botucatu, Vitoviana Carradão (MCZ); Rio Claro (MZSP); Horto Rio Claro (MZSP). *Paraná:* Salto Caxias, Rio Iguaçu (MCN); Fóz do Iguaçú, Refugio Biologico de Bela Vista (MCN); Parque Nacional de Iguaçn (MCN).

→

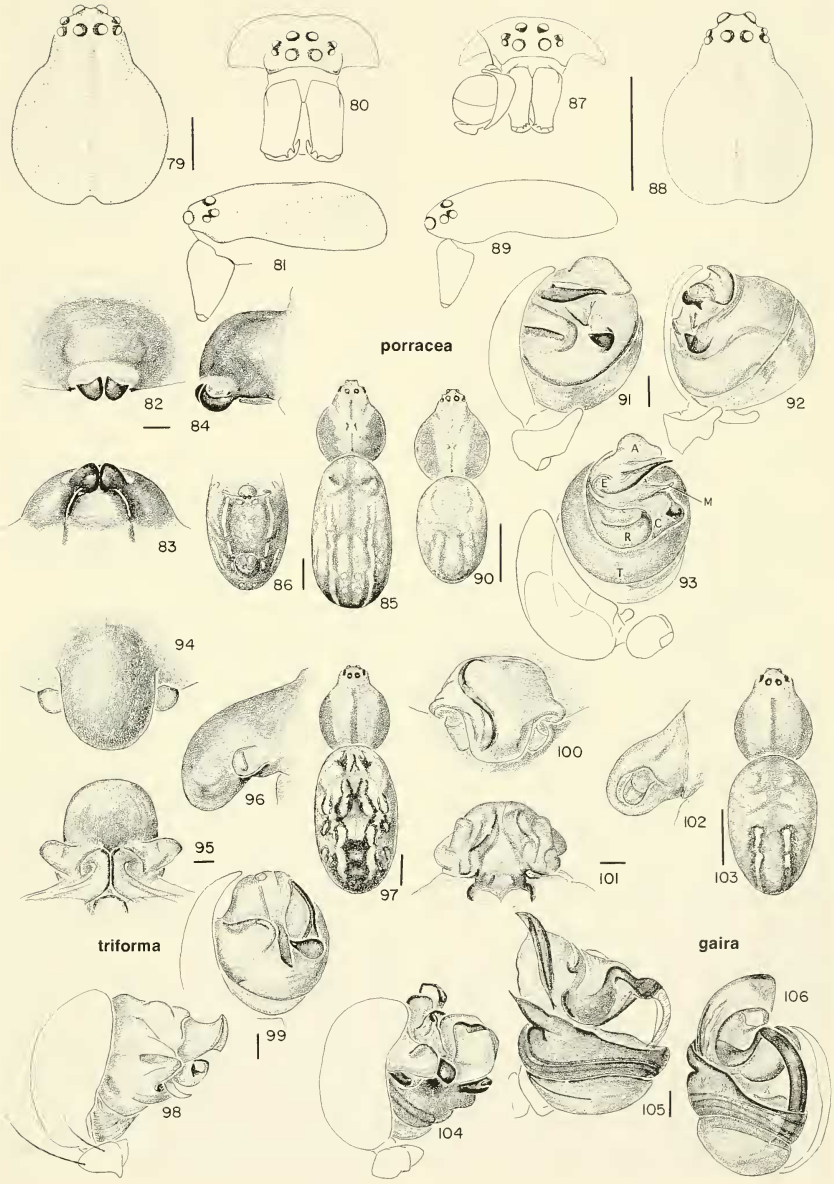
Figures 79–93. *Manogea porracea* (C. L. Koch). 79–86, female. 79, carapace; 80, eye region and chelicerae; 81, carapace and chelicera, lateral. 82–84, epigynum. 82, ventral; 83, posterior; 84, lateral. 85, dorsal; 86, abdomen, ventral. 87–93, male. 87, eye region, chelicerae and right palpus; 88, carapace; 89, carapace and chelicera, lateral; 90, dorsal; 91, left male palpus. 91, mesal; 92, ventral; 93, expanded.

Figures 94–99. *M. triforma* new species. 94–97, female. 94–96, epigynum. 94, ventral; 95, posterior; 96, lateral. 97, dorsal. 98, 99, male palpus. 98, mesal; 99, ventral.

Figures 100–106. *M. gaira* new species. 100–103, female. 100–102, epigynum. 100, ventral; 101, posterior; 102, lateral. 103, dorsal. 104–106, male palpus. 104, mesal; 105, ventral; 106, ectal.

Abbreviations. A, terminal apophysis; C, conductor; E, embolus; M, median apophysis; R, radix; T, tegulum.

Scale lines: genitalia 0.1 mm; others 1.0 mm.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porracea
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100
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102
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triforma
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104
gaira
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106

Rio Grande do Sul: Parque de Turvo, Tenente Portela (MCN). BOLIVIA *Beni:* Estación Biológica Beni, 5 km N El Porvenir (USNM). PARAGUAY *Alto Paraná:* Taquarazapa [? Tacuara] (AMNH). ARGENTINA *Misiones:* Parque Nacional Iguazú (MACN); San Ignacio (MLP).

Manogea triforma new species
Figures 94–99; Map 3B

Argiope trivittata:—O. P.-Cambridge, 1889: 51, pl. 4, fig. 6, ♀ [not fig. 5, ♂]. Syntypes from Dolores, Sacrixpur [?], betw. Dolores and Chapallal [?] and San José River near Chiquimuh [Chiquimula, 14°47′N, 89°32′W], Guatemala, in BMNH, examined.

Hentzia trivittata:—F. P.-Cambridge, 1904: 523, pl. 51 [not fig. 12, ♂]. F. P.-Cambridge designated the male as type and females as "gynetypes".

Holotype. Male holotype and female paratype from Palenque Ruins, 17°29′N, 92°01′W, Chiapas, Mexico, 2–11 July 1983 (W. Maddison, R. S. Anderson) in MCZ. The name is an arbitrary combination of letters.

Note. I am following F. P.-Cambridge's type designation and am forced to make a synonym of the name *trivittata* and to name a new species for the female.

Description. Female paratype. Carapace yellowish with three dark longitudinal bands (Fig. 97). Chelicerae yellowish. Labium, endites brown. Sternum yellowish. Legs yellowish with femora having indistinct dorsal lines, other articles with some indistinct black spots. Abdomen white, gray and black (Fig. 97); venter with a pair of white, longitudinal bands, each broken into four elongate patches. Abdomen oval, widest in middle (Fig. 97). Total length 7.2 mm. Carapace 2.9 mm long, 2.2 wide in thoracic region, 1.1 wide behind posterior median eyes. First femur 4.0 mm, patella and tibia 4.0, metatarsus 3.5, tarsus 1.4. Second patella and tibia 3.5 mm, third 2.2, fourth 3.4.

Male holotype. Coloration as in female, but pattern on abdomen less distinct. Height of clypeus equals diameter of anterior median eye. Palpal patella with one macroseta, but two macrosetae on palpal tibia (Fig. 98). Abdomen as in female. Total length 3.7 mm. Carapace 1.85 mm long, 1.45 wide in thoracic region, 0.66 wide behind posterior median eyes. First femur 2.47 mm, patella and tibia 2.60, metatarsus 2.21, tarsus 1.04. Second patella and tibia 2.28 mm, third 1.29, fourth 1.95.

Note. Males and females were collected together.

Variation. Total length of females 7.5 to 14.4 mm. The illustrations were made from specimens from Palenque Ruins, Chiapas, the male palpus from the mirror image of the right palpus.

Diagnosis. The female of this species differs from *M. gaira* by having the median lobe of the epigynum with its sides parallel (Fig. 94), whereas that of *M. gaira* has a shallow notch on each side posteriorly (Fig. 100). The male palpus (Figs. 98, 99) lacks the long coiled embolus of *M. gaira* (Figs. 105, 106).

Natural History. The Chiapas specimens were from the edge of rain forest, the Honduran specimens from beach vegetation.

Specimens Examined. HONDURAS Tela, beach, 26 July 1929, 2♀ (A. M. Chickering, MCZ).

Manogea gaira new species
Figures 100–106; Map 3B

Holotype. Male holotype, six female paratypes from Gaira, 10 m, Depto. Magdalena, Colombia, Dec. 1975 (W. Eberhard), in MCZ. The specific name is a noun in apposition after the locality.

Description. Female paratype. Carapace yellowish with median line and sides of thoracic region gray (Fig. 103). Chelicerae yellow-white. Labium, endites brown. Sternum, legs yellowish. Abdomen dorsum with white patches, large at middle, smaller on sides, and posteriorly with one pair of white bands bordered gray (Fig. 103). Venter with pair of white longitudinal bands, each broken into three pieces and between them some white patches all outlined by gray to black. Total length 3.7 mm. Carapace 1.88 mm long, 1.58 wide in thoracic region, 0.87 wide behind posterior median eyes. First femur 3.02 mm, patella and tibia 2.61, metatarsus 2.01, tarsus 0.90. Second patella and tibia 2.36 mm, third 1.39, fourth 2.05.

Male holotype. Coloration less distinct than that of female. Total length 2.7 mm. Carapace 1.53 mm long, 1.20 wide in thoracic region, 0.53 wide behind posterior median eyes. First femur 1.76 mm, patella and tibia 1.92, metatarsus 1.43, tarsus 0.78. Second patella and tibia 1.69 mm, third 0.94, fourth 1.39.

Note. Males and females were collected together.

Variation. Total length of females 3.7 to 4.2 mm. The illustrations were made from the female paratypes and male holotype.

Diagnosis. The epigynum of the female differs from that of *M. triforma* by having a median bulge with a pair of shallow, lateral notches containing cups with openings (Figs. 100–102). Pieces of broken male embolus show through the transparent bulge (Figs. 100–102). The male differs by having a palpus with a long, coiled, flat embolus (at 3h in Figs. 105, 106).

Paratypes. Nine female paratypes with same data as holotype (Eberhard 1038, EG2 17ff, MCZ).

Specimens Examined. VENEZUELA *Falcón:* Urumaco, 10 July 1972, 1♀, 2 imm. (B. Patterson, MCZ). *Lara:* Quebrada Marín, 5 km NW Altagracia, 2–6 Oct. 1972, 1♀, 6 imm. (B. Patterson, MCZ).

Kapogea new genus

Type Species. Cyrtophora sellata Simon, 1895b. The name is an arbitrary combination of letters attached to *Gea.* The gender of the name is feminine.

Diagnosis. Kapogea differ from most other araneids, except some *Manogea* and *Cyrtophora,* by having the eyes of the posterior eye row straight (Figs. 107, 118) (rarely an individual has the posterior eyes recurved). *Kapogea* females differ from females of *Manogea* by having the cephalic region of the carapace wide (Figs. 107, 129, 136, 144). Also, female *Kapogea* adults are larger than *Manogea* adults, and the legs are thick and relatively short, the total length of the first patella and tibia being about 5 to 7 diameters of the tibia (Fig. 115).

Many *Kapogea* differ from *Cyrtophora* by having two dorsal white lines on the abdomen and by the bodyshape, the elongate, shield-shaped abdomen flattened anteriorly and pointed posteriorly (Figs. 115, 129, 136, 144; [2] in Table 1).

Kapogea always differ from *Cyrtophora* by having two sometimes indistinct openings of the epigynum on a lightly sclerotized hemisphere (Figs. 110, 126, 133, 140; [8] in Table 1), whereas in *Cyrtophora* the openings are anterior to a sclerotized shelf (Figs. 148–150; [9] in Table 1). The palpus of the male is less sclerotized than in *Cyrtophora.* In *Kapogea* the embolus (E) is supported by a flat, soft terminal apophysis (A in Figs. 123–125) with the conductor (C in Figs. 123–125) supporting a soft median apophysis (M), whereas in *Cyrtophora,* the conductor supports the embolus (Figs. 154, 155).

Description. Females. Carapace light to dark without any distinct marks. Abdomen brown, often with a pair of thin, light, longitudinal lines, straight in *K. alayoi* (Fig. 136) and some immature *K. sexnotata* (Fig. 143), jagged in *K. cyrtophoroides* (Fig. 129), and absent in *K. sellata.* Venter with a pair of white lines on black, and a white patch on each side of spinnerets (Fig. 116). Anterior eyes equally spaced, or medians farther from laterals. Posterior median eyes closer to each other than to laterals (Figs. 107, 108). Lateral eyes separated by 0.7 to 1.2 diameters of posterior lateral eye (Fig. 108). Ocular quadrangle wider in front than behind, longer than wide in front (Figs. 107, 108). Height of clypeus less than diameter of anterior median eye (Fig. 108). Third and fourth femora about equal in length to combined patella and tibia of same leg. Length of metatarsus and tarsus about equal in length to patella and tibia of same leg (Fig. 115). Legs thick (Fig. 115), length of first patella and tibia about 6 to 7 times width of tibia.

Males. Less than 20 percent of total length of female (left in Figs. 115, 129, 136, 144). Coloration as in female. Cephalic region about half width of thoracic region, sometimes wider or narrower (Fig. 118). Anterior eyes equally spaced or medians closer to laterals (Figs. 117, 118)

than to each other. Spacing of posterior row of eyes variable. Lateral eyes barely separated (Fig. 118). Third and fourth femur almost as long, equal in length or slightly longer than combined patella and tibia of same leg; metatarsus and tarsus of equal length. Legs thick. Endite without tooth, palpal patella with one seta, first coxa without hook. Shape of abdomen oval (Figs. 120, 132, 139, 147).

Silk Glands. The aggregate and flagelliform silk glands are assumed to be absent (judging by their absence in both *Manogea* and *Cyrtophora*), but no specimens have been examined.

Relationship. The many similar characters place *Kapogea* close to *Cyrtophora.* The support of the palpal median apophysis by the conductor is specialized in *Kapogea.*

Natural History. The webs observed are similar to the webs of *Mecynogea* species, horizontal and lacking viscid threads (Plates 2A, B, C).

Distribution. All four species are tropical American.

Separating Species. Females can be distinguished by the shape and coloration of the abdomen (Figs. 115, 129, 136, 144). The epigyna of all are quite similar, that of *K. sellata* (Fig. 110) being most distinct. The males also are easiest to distinguish by the coloration of the abdomen (Figs. 120, 132, 139), except for *M. sexnotata* (Fig. 147) which has a distinct palpus (Figs. 145, 146). But perhaps mistakes were made with separating the males: *Kapogea sellata* had 17 collections of females, five of males; *K. cyrtophoroides* 24 and 10; *K. alayoi* 22 and three; *K. sexnotata* 22 and four.

Illustrations of the dorsal side of the epigynum were made one for each species, and almost no differences were found between species. (Perhaps, if an illustration for each specimen were made, distinguishing characters might be discovered.) Illustrations of terminal apophysis of the palpus were made in dorsal view; individual variation was found, but no useful differences between species. Neither set of illustrations is reproduced here.

KEY TO FEMALE *KAPOGEA*

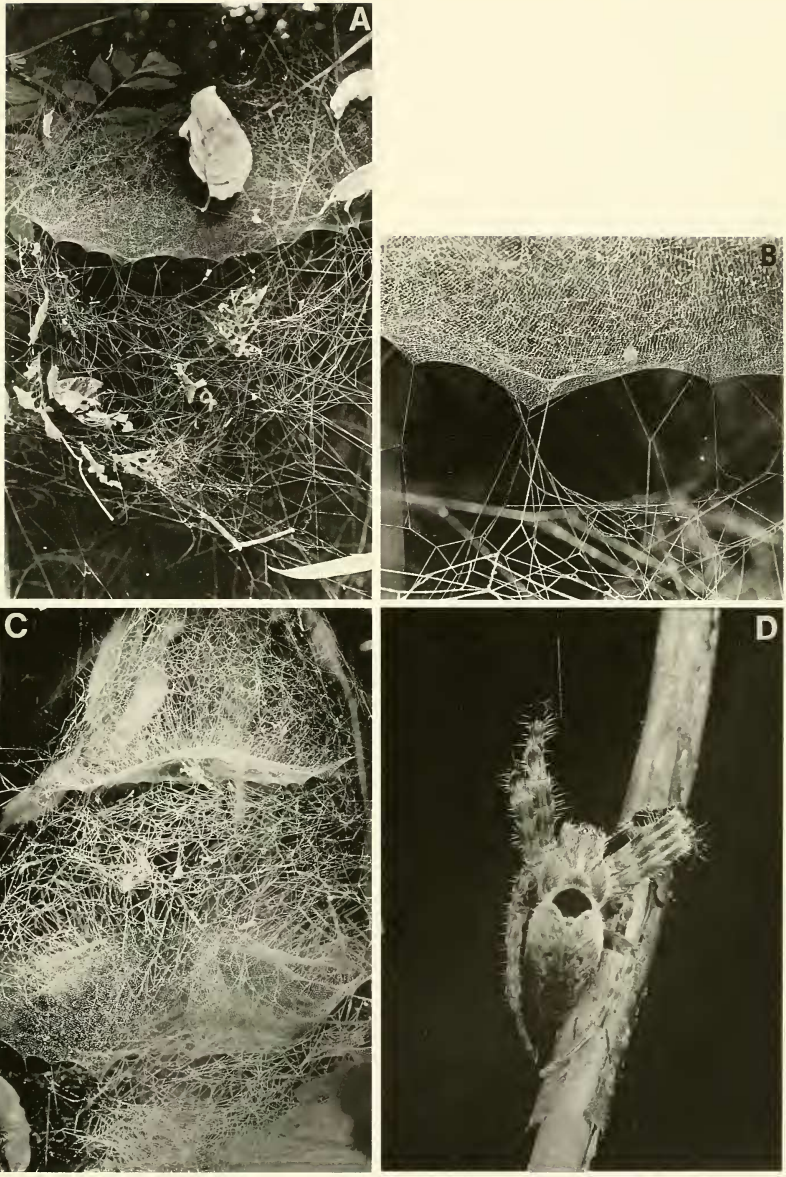
1. Abdomen with a distinct, well defined, black patch anteriorly between humps (Fig. 115); Greater Antilles, Costa Rica to Argentina (Map 4A) ..... *sellata*
– Abdomen otherwise (Figs. 129, 136, 144) 2
2(1). Adult abdomen black with three pairs of white spots (Fig. 144); adult total length more than 17.5 mm; Venezuela and upper Amazon area (Map 4D) ..... *sexnotata*
– Abdomen with a pair of lines, rarely brown without marks (Figs. 129, 136); adult total length usually less than 17 mm 3
3(2). Abdomen with zigzag lines, humps located dorsally (Fig. 129); southern Mexico to Amazon region (Map 4C) ..... *cyrtophoroides*
– Abdomen with straight lines and dorsal or projecting lateral humps (Figs. 136, 143) 4
4(3). Abdomen with humps laterally (Fig. 136); Bahamas, Greater Antilles, Panama to northern Argentina (Map 4B) ..... *alayoi*
– Abdomen of immature with humps dorsally (Fig. 143) ..... *sexnotata*

KEY TO MALE *KAPOGEA*

1. Palpus with median apophysis distally biforked into two short filaments (between center and 3h in Fig. 145, center in Fig. 146) and terminal apophysis with lip (at 12h in Fig. 145); Venezuela, upper Amazon area (Map 4D) ..... *sexnotata*
– Palpus with median apophysis not biforked, having only one short filament, terminal apophysis without lip (M in Fig. 124, and in Figs. 121, 130, 137) 2
2(1). Abdomen with lobed folium pattern (Fig. 132), southern Mexico to Amazon region (Map 4C) ..... *cyrtophoroides*
– Abdomen marked otherwise (Figs. 120, 139) 3
3(2). Abdomen with anterior black patch (Fig. 120); Greater Antilles, Costa Rica to Argentina (Map 4A) ..... *sellata*

→

Plate 2. A, web of *Kapogea sellata* in Panama. B, detail of web. C, webs of *K. alayoi* in Peru, width of photo is 12 cm. D, female *K. sellata* from Peru, laboratory photo. (Photos A, B, Y. Lubin; C, J. Coddington)


A
B
C
D

Abdomen with two almost straight white lines and lateral, anterior humps (Fig. 139); Bahamas, Greater Antilles, Panama to northern Argentina (Map 4B) *alayoi*

Kapogea sellata (Simon) new combination

Plate 2; Figures 107–122; Map 4A

Cyrtophora (*Exatria*) *sellata* Simon, 1895b: 155. One female holotype from Santo Domingo Isl. [presumably Hispaniola], in MNHN, examined.

Araneus rugosus Franganillo, 1936: 75, fig. 33, tarsal tip. Specimen from Habana Prov., Cuba, in ACCH, examined. Name preoccupied by Badcock, 1932: 24. NEW SYNONYMY.

C. sellata:—Roewer, 1942: 751. Bonnet, 1956: 1368. Blanke, 1976: 125, fig. 1, ♀.

Note. A labeled specimen of *Araneus rugosus* from ACCH was examined.

The male illustrated by Blanke (1976), collected in Vitoria, Est. Espírito Santo, Brazil, with a female, is apparently the male of *K. sexnotata*. The specimen is lost.

Description. Female from near Putumayo, Colombia. Carapace golden-yellow with some white setae (Fig. 115). Chelicerae dark brown. Labium, endites lighter brown. Sternum brown. Coxae lighter brown than sternum. Legs yellow-brown, first and second tibia with dark distal ring. Third and fourth with brown ring, more distinct on venter. Abdomen light brown, darkest posteriorly with an anterior, almost circular, median brown patch framed by a light line (Fig. 115), sides of abdomen much lighter, venter with a pair of white brackets, facing each other (Fig. 116). Carapace with a shallow transverse thoracic depression. Anterior median eyes 0.9 diameter apart, 1.8 diameters from laterals. Posterior median eyes 1.0 diameter apart, 2.5 diameters from laterals. Lateral eyes separated by 0.5 diameter of posterior lateral. Total length 18 mm. Carapace 7.0 mm long, 4.9 wide in thoracic region, 3.0 wide in cephalic region. First femur 6.5 mm, patella and tibia 7.1, metatarsus 4.7, tarsus 1.7. Second patella and tibia 6.7 mm, third 3.8, fourth 5.8.

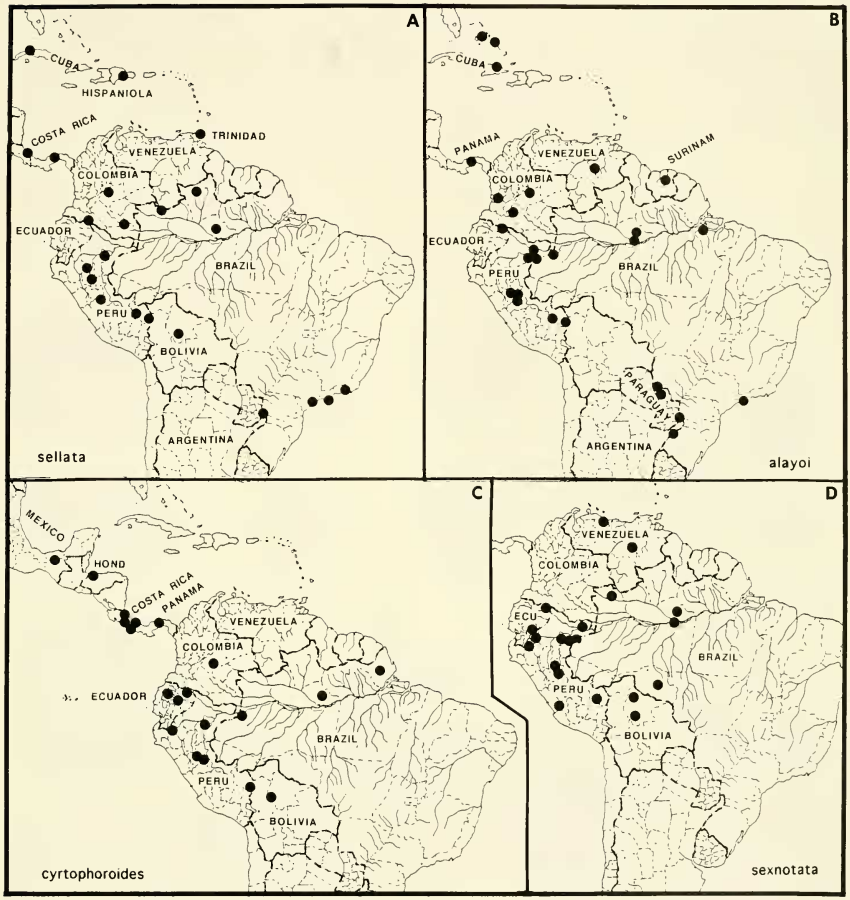
Male from near Moyobamba, Peru. Carapace dark brown, yellowish between eyes, with a pair of elongate lighter patches behind eyes (Fig. 120). Chelicerae orange-brown, with a dark patch. Labium, endites light brown. Sternum brown. Legs with first coxae and femora dark, others light; distal end of tibia with wide brown rings. Abdomen whitish with anterior median black patch (Fig. 120), as in female; venter with white spots and gray pigment. Anterior median eyes 0.7 diameter apart, 0.3 diameter from anterior laterals. Posterior median eyes 1.0 diameter apart, 0.9 diameter from posterior laterals. Laterals separated by 0.5 diameter of posterior lateral eye. Total length 2.7 mm. Carapace 1.56 mm long, 1.14 wide in thoracic region, 0.62 wide behind posterior median eyes. First femur 1.63 mm, patella and tibia 1.78, metatarsus 1.17, tarsus 0.65. Second patella and tibia 1.62 mm, third 0.79, fourth 1.23.

Note. Males and females can be paired on the basis of the similar dark patch on the abdomen, but have not been collected together.

Variation. Total length of females 12.2 to 19 mm, males 2.7 to 2.8. The eye sizes of the male described (Fig. 120) and the one illustrated differ slightly (Figs. 117–119). The illustrations were made of a female from Colombia; Figures 117–119 from a male from Colombia; Figures 120–122 from a male from Peru. Some males lack the dark patch on the abdomen and are difficult to determine.

Diagnosis. The dark patch on the anterior of the abdomen in males and females facilitates ready distinction from other *Cyrtophora* species. (The venter of the epigynum has a pair of round to oval openings with transparent frame, difficult to see, and difficult to compare with other species.) The longest lobe of the terminal apophysis of the male palpus seems narrower and longer (Fig. 121) than that of other species.

Natural History. Specimens have been collected at the forest edge in the Dominican Republic, in humid forest in Costa Rica, in forest in Panama and in forest in-



Map 4. Distribution of *Kapogea* species.

terior at Reserva Dimona, Manaus, Brazil (Plate 2).

Distribution. Greater Antilles, Costa Rica to Argentina (Map 4A).

Specimens Examined. GREATER ANTILLES *Dominican Republic. Sánchez-Ramírez:* Mina Pueblo Viejo nr. Hatillo, 500m, 21 Mar. 1984, 4 imm.,1♀ (H., L. Levi, MCZ). LESSER ANTILLES *Trinidad:* St. Augustine, Nov. 1944, 1♀ (R. H. Montgomery, AMNH).

COSTA RICA *Limón:* Penshurst, 10 km N Cahuita, 13–15 Apr. 1983, 1 imm. (D. Ubick, DU). PANAMA *Panamá:* Barro Colorado Island, 29 July 1939, 1 imm. (A. M. Chickering, MCZ); 30 Aug. 1969, 1 imm.; 14 Sept. 1973, 1♀; 18 Nov. 1973, 1♀ (both Y. Lubin, MCZ); Pipeline Road, 19 July 1976, 1♀ (M. Robinson, MCZ).

COLOMBIA *Meta:* Hacienda Mozambique, 15 km

SW Puerto López, June 1978, 1♂ (W. Eberhard, MCZ). *Putumayo:* Río Putumayo nr. Puerto Asis, no date, 1♀ (W. Eberhard, MCZ). *Amazonas:* Araracuaro, 270 m, 10 Mar. 1988, 1♀ (C. Valderrama, CV). PERU *Loreto:* Alto Río Samiria, 10 May 1950, 1♀ (D. Silva, MUSM). *Pasco:* Huancabamba, Quebrada Castillo, NW Iscozacin, 10°10′S, 75°15′, 6 Sept. 1987, 1♂ (D. Silva, MUSM). *San Martin:* Mishiqui-yacu, 20 km NE Moyobamba, Aug. 1947, 1♂ (F. Woytkowski, AMNH); Juanjui, 350 m, 16–24 Aug. 1948, 1♀ (D. Silva, MUSM). *Madre de Dios:* Tambopata Reserve, Río Tambopata, 30 Mar. 1988, 1♀ (J. Palmer, D. Smith, MCZ); 2 May 1988, 1♀ (D. Silva, MUSM); Zona Reservata Pakitza, 9–13 May 1991, 2♀ (D. Silva, MUSM). BRAZIL *Roraima:* Estação Ecológica de Maracá, Ilha de Maracá, Rio Uraricoera, 21–30 Nov. 1987, 1♂ (J. A. Rafael, MCN 23349). *Amazonas:* Parque Nacional do Pico da Neblina, 28 Sept. 1990, 1♀ (A. A. Lise, MCP); Reserva Dimona, 80 km N Manaus, 26 Mar. 1991, 1♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ). *Rio de Janeiro:* Pinheiro, Rio de Janeiro, 1 imm. (MNRJ). *São Paulo:* Poco Grande, Juquiá, Jan. 1898, 2♀ (E. Simon determ., MZSP 8037); Ilha de São Sebastião, 1♀ (Lange, MNRJ). BOLIVIA *Beni:* 27 km SW Yocomo, 15°23′S, 66°59′W, 15–19 Nov. 1989, 1♂ (J. Coddington et al., USNM). ARGENTINA *Misiones:* Par. Nacional Iguazú, Oct. 1979, 1♀ (M. E. Galiano, MACN); 24–30 July 1992, 1♀ (M. J. Ramírez, MACN).

Kapogea cyrtophoroides (F. O. P. Cambridge) new combination

Figures 123–131; Map 4C

Araneus cyrtophoroides F. O. P.-Cambridge, 1904: 518, pl. 51, fig. 4, ♀. Female holotype from Teapa [Est. Tabasco], Mexico, in BMNH, examined. Bonnet, 1955: 481.

Araneus setospinosus Chamberlin and Ivie, 1936: 48, pl. 14, fig. 124, ♀. Female holotype from Barro Colorado Island [Lago Gatún, Panamá Prov.], Panama, in AMNH, examined. Bonnet, 1955: 598. NEW SYNONYMY.

Cyrtophora nympha:—Levi (1991: 178). Not *C. nympha* Simon.

Aranea cyrtophoroides:—Roewer, 1942: 840.

Aranea setospinosa:—Roewer, 1942: 852.

Note. The holotype of *Araneus cyrtophoroides* is the most northern specimen of this species collected. *Araneus setospinosus* types were examined and the description has good illustrations to synonymize the name. The synonymy of *A. cyrtophoroides* and *A. setospinosus* in Levi (1991: 178) is in error.

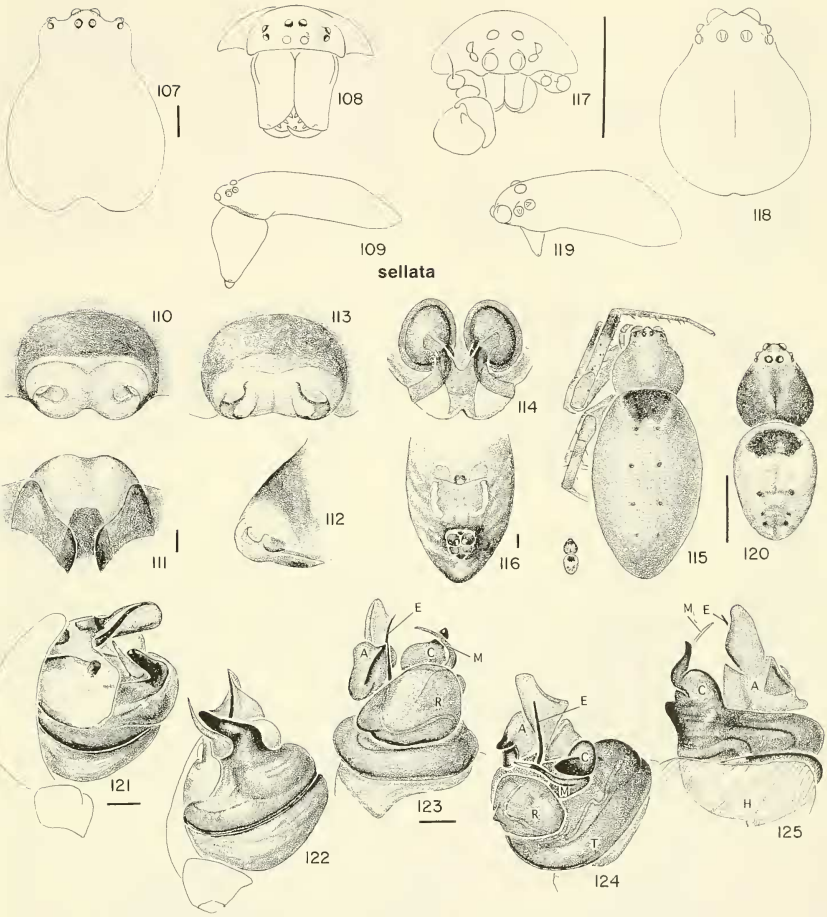
Description. Female from La Selva, Costa Rica. Carapace light orange-brown (Fig. 129). Chelicerae, labium, endites, sternum light dusky orange-brown. Coxae, legs light orange-brown without rings. Abdomen light orange-brown with a pair of zigzag, longitudinal white lines. Anterior ends of lines originating on hump and bordered by black hairs (Fig. 129); venter of abdomen with two white brackets on black, no white spots on sides of spinnerets. Anterior median eyes 1.2 diameters apart, 1.2 diameters from laterals. Posterior median eyes 1.2 diameters apart, 2.2 diameters from laterals. Lateral eyes separated by diameter of posterior laterals. Total length 10.5 mm. Carapace 5.4 mm long, 4.1 wide in thoracic region, 2.3 wide in cephalic region. First femur 4.7 mm, patella and tibia 5.2, metatarsus 3.0, tarsus 1.4. Second patella and tibia 4.8 mm, third 3.0, fourth 4.5.

Male from Costa Rica. Carapace dark brown. Chelicerae yellowish with gray streaks. Labium and endites brown to dark brown. Sternum yellowish. Legs with wide brown rings, first two femora brown. Abdomen black, with a pair of jagged lines dorsally (Fig. 132) and a pair of broken white lines ventrally. Total length 2.7 mm. Carapace 1.33 mm long, 1.11 wide in thoracic region, 0.57 wide in cephalic region. First femur 1.13 mm, patella and tibia 1.29, metatarsus 0.78, tarsus 0.51. Second patella and tibia 1.17 mm, third 0.65, fourth 0.97.

Note. Males and females were matched because they were both collected at La Selva, Costa Rica; Lomalinda, Colombia; and on Barro Colorado Island and have similar abdominal color pattern.

Variation. Total length of mature females 7.2 to 13.5mm, males 2.5 to 2.7. Rarely, the abdomen lacks folium pattern, making determination difficult.

Diagnosis. The abdomen is oval in both sexes, with the humps dorsal (Figs. 129, 132), unlike that of *K. alayoi* (Figs. 136, 139) which has the humps lateral. *Kapogea cyrtophoroides* has a pair of zigzag white lines on each side dorsally (Figs. 129, 132),



Figures 107–122. *Kapogea sellata* (Simon). 107–116, female. 107, carapace; 108, eye region and chelicerae; 109, carapace and chelicera, lateral. 110–114, epigynum. 110, 113, ventral; 111, posterior; 112, lateral. 110–112, (from Depto. Meta, Colombia); 113, (from São Paulo, Brazil). 114, cleared, dorsal; 115, dorsal with male on left. 116, abdomen, venter 117–122, male. 117, eye region chelicerae and right palpus; 118, carapace; 119, carapace and chelicera, lateral; 120, dorsal. 121, 122, left male palpus. 121, mesal; 122, ventral.

Figures 123–125. *K. cyrtophoroides* (F. P.-Cambridge), male left palpus, expanded. 123, subdorsal; 124, submesal; 125, subventral.

Abbreviations. A, terminal apophysis; C, conductor; E, embolus; H, hematodocha; M, median apophysis; R, radix; T, tegulum.

Scale lines: genitalia 0.1 mm; others 1.0 mm.

whereas *K. alayoi* has a pair of nearly straight, dorsal white lines (Figs. 136, 139).

Natural History. Specimens were found by shaking foliage in wet tropical forest in Costa Rica, in forest in southern Peru.

Distribution. Southern Mexico to Amazon Region (Map 2C).

Specimens Examined. HONDURAS Lancetilla nr. Tela, mountain trail, 22 July 1929, 1♀ (A. M. Chickering, MCZ). COSTA RICA *Heredia:* La Selva nr. Puerto Viejo, 15–27 Sept. 1981, 1♂; Oct. 1981, 2 imm. (C. E. Griswold, CAS); Feb. 1981, 1♀, 1♂ (W. E. Eberhard, ♂ 2201, MCZ); May 1986, 1♂ (W. Eberhard, 3272, MCZ). *San José:* Quizarra, 6 km E San Isidro, May 1989, 1♂ (W. Eberhard, MCZ); 3 km NE Golfito, 22–23 May 1987, 1♂ (D. Ubick, DU). PANAMA *Bocas del Toro:* Bocas del Toro, 15 Sept. 1975, 1♀ (E. de Fuentes, MIUP). *Panamá:* Barro Colorado Island, Mar. 1933, 1♀ (F. Lutz, AMNH); June 1936, 1♂ (A. M. Chickering, MCZ); Madden Dam area, 2 Sept. 1956, 1♀ (W. Lundy, AMNH); Pipeline Road, 19 Mar. 1976, 1♀; Jan., Feb. 1977, 1♂ (M. Robinson, ♂ raised from egg, MCZ); Gamboa, Pipeline Road, Aug., Sept. 1976, 1♀ (M. Robinson, MCZ).

COLOMBIA *Meta:* Lomalinda, Puerto Lleras, 3°18′N, 73°22′W, Mar. 1980, 6♂; 12 July 1985, 1♀; 12 Dec. 1985, 1♀ (W. T. Carroll, MCZ); Mar.–Apr. 1986, 2♂ (V., B. Roth, W. T. Carroll, CAS). ECUADOR *Pichincha:* Tinalandia, 12 km E Santo Domingo de los Colorados, 11–17 May 1986, 1♀ (G. B. Edwards, FSCA). *Sucumbíos:* Reserva Faunistica Cuyabeno, Laguna Grande, 0°00′, 76°10′W, 5 Aug. 1988, 1♀, determ. uncertain (W. Maddison, 88–021, MCZ); Limoncocha, 300 m, 24–26 June 1980, 1♀ (H. V., C. B. Weems, FSCA). *Pastaza:* Puyo, Río Pastaza, 14 Apr. 1958, 1♀ (W. Weyrauch, CAS). PERU *Loreto:* Alto Río Samiria, 05°07′S, 75°28′W, 1♀ (D. Silva, MUSM); Cocha Shanguito, 05°08′S, 74°45′W, 25 May 1990, 2♀ (D. Silva, MUSM). *Amazonas:* Alto Río Comaina, Puesto de Vigilancia Falso Paquisha, 21 Oct.–3 Nov. 1987, 2 imm., 2♀ (D. Silva, MUSM). *Huánuco:* 69 km E Tingo María, 5 Oct. 1954, 1 imm. (E. S. Ross, E. I. Schlinger, CAS); Monson Valley, Tingo María, 19 Oct. 1964, 1♀ (E. I. Schlinger, E. S. Ross, CAS); Dantas la Molina, SW de Puerto Inca, 18 May–1 June 1987, 1♀ (D. Silva, MUSM). *Madre de Dios:* 15 km E Puerto Maldonado, 200 m, 12°33′S, 69°00′W, 22 June–16 July 1989, 3 imm., 1♀ (D. Silva, MUSM); Zona Reservata Tambopata, 290 m, 31 July 1987, 1♀; 20 Sept. 1991, 1♀ (D. Silva, MUSM). BRAZIL *Amapá:* Serra do Navio, June 1966, 1♀ (M. E. Galiano, MACN). *Roraima:* Ilha de Maracá, Rio Uraricoera, 17 July 1987, 1♀ (A. A. Lise, MCN 20063). *Amazonas:* Tabatinga, Aug. 1984, 1♀ (A. Cerrutti, MNRJ); Reserva Cabo Frio, 21 Sept. 1989, 1♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ). BOLIVIA *Beni:* 19.5 km S Rurrenabaque, 14°38′S, 67°20′W, 22 Nov. 1989, 1♂ (J. Coddington et al., USNM).

Kapogea alayoi (Archer) new combination
Figures 133–139; Map 4B

Cyrtophora alayoi Archer, 1958: 9, figs. 14–16, ♂. Male holotype from Banes, Oriente Prov. [now in Holguín Prov.], Cuba, in AMNH, examined. Brignoli, 1983: 267.

Note. The holotype of the name *Cyrtophora nympha* has straight, dorsal, abdominal lines (Fig. 143), and I considered the name once as a senior synonym of both *K. cyrtophoroides* and *K. alayoi,* before I had distinguished the last two species. But the holotype of *C. nympha* is an immature as are all the specimens closest to the *C. nympha* type, all of larger size than mature *C. cyrtophoroides* and *C. alayoi,* and all are believed to be immatures of *C. sexnotata.*

Description. Female from Pipeline Road [Prov. Panamá], Panama. Carapace light brown, with white and brown setae (Fig. 136). Chelicerae labium, endites, brown. Sternum brown. Legs brown. Abdomen with a pair of straight white lines dorsally (Fig. 136); venter with a white, L-shaped band on spider's right, facing a

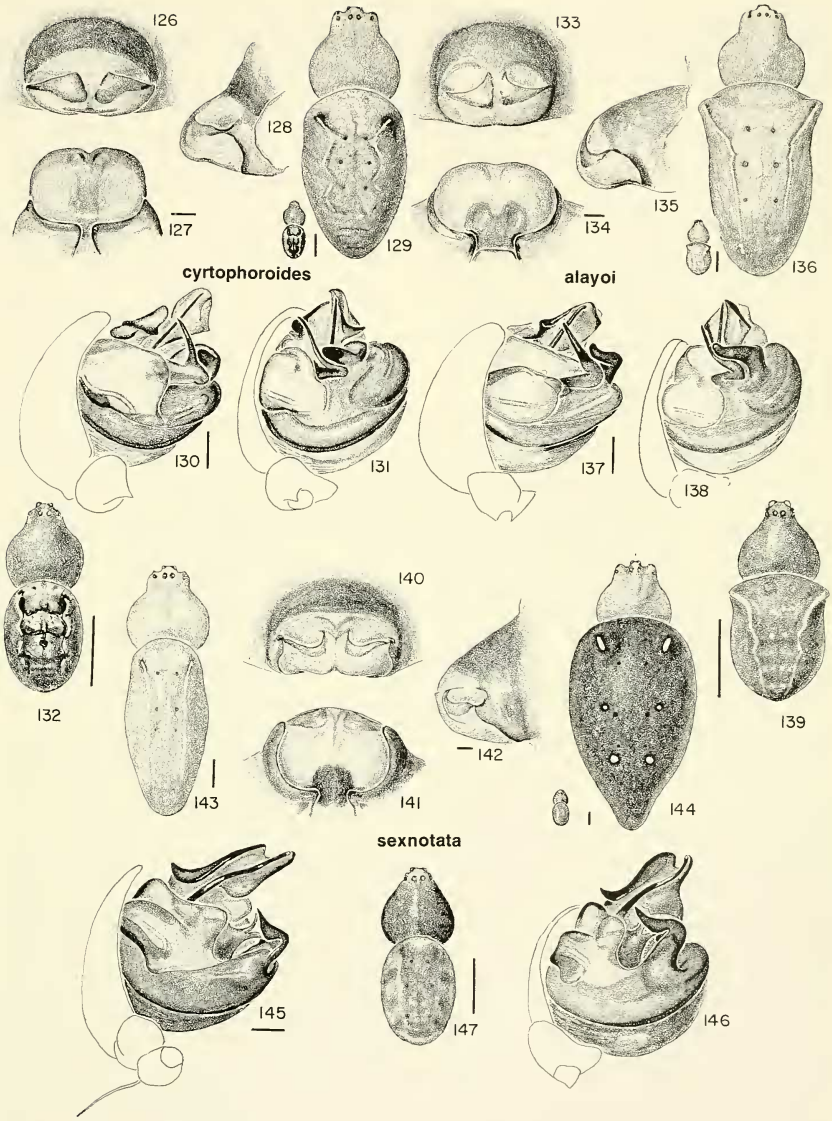
→

Figures 126–132. *Kapogea cyrtophoroides* (F. P.-Cambridge). 126–129, female. 126–128, epigynum. 126, ventral; 127, posterior; 128, lateral. 129, dorsal with male on left. 130–132, male. 130, 131, left male palpus. 130, mesal; 131, ventral. 132, dorsal.

Figures 133–139. *Kapogea alayoi* (Archer). 133–136, female. 133–135, epigynum. 133, ventral; 134, posterior; 135, lateral. 136, dorsal with male on left. 137–139, male. 137, 138, male palpus. 137, mesal; 138, ventral. 139, dorsal.

Figures 140–147. *Kapogea sexnotata* (Simon) 140–144, female. 140–142, epigynum. 140, ventral; 141, posterior; 142, lateral. 143, immature, dorsal; 144, dorsal with male on left. 145–147, male. 145, 146, male palpus. 145, mesal; 146, ventral. 147, dorsal.

Scale lines: genitalia 0.1 mm; others 1.0 mm.


126
127
128
129
cyrtophoroides
133
134
135
136
alayoi
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131
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139
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sexnotata
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similar band on left, both on black; otherwise venter brown, spinnerets dark brown. Anterior median eyes 1.1 diameters apart, 1.1 diameters from laterals. Posterior median eyes 1.1 diameters apart, two diameters from laterals. Laterals separated by the diameter of posterior lateral eye. Total length 12 mm. Carapace 5.0 mm long, 4.3 wide in thoracic region, 2.1 wide behind posterior median eyes. First femur 5.1 mm, patella and tibia 5.6, metatarsus 4.1, tarsus 1.4. Second patella and tibia 5.1 mm, third 2.9, fourth 4.4.

Male holotype. Coloration as in female (Fig. 139), but legs with first femur and tibia brown, others ringed brown on yellowish. Anterior median eyes 0.9 diameter apart, 0.4 diameter from laterals. Posterior median eyes 0.8 diameter apart, 0.9 diameter from laterals. Lateral eyes separated by 0.5 diameter of posterior lateral. Posterior eye row slightly recurved. Total length 2.6 mm. Carapace 1.27 mm long, 1.05 wide in thoracic region, 0.58 wide behind posterior median eyes. First femur 1.09 mm, patella and tibia 1.25, metatarsus 0.74, tarsus 0.48. Second patella and tibia 1.09 mm, third 0.60, fourth 0.83.

Note. Males and females were matched because both have the same shape, the abdomen with anterior, lateral humps, and have straight lines on the dorsal surface of the abdomen.

Variation. Total length of females 9.5 to 14.5 mm. The illustrations were made from a female from Pipeline Road, Panama, and the male holotype from Cuba.

Diagnosis. In both females and males *Kapogea alayoi* differs from *K. cyrtophoroides* by having a shield-shaped abdomen with lateral, pointed humps (Figs. 136, 139), whereas that of *K. cyrtophoroides* is oval with dorsal humps (Figs. 129, 132). The abdomen has two almost straight lines, whereas (Figs. 129, 132) that of *K. cyrtophoroides* has a folium bordered by a jagged line on each side (Figs.129, 132).

Natural History. "I was struck by the similarity to the webs of *Mecynogea* and *Cyrtophora*, both of which I have seen. But in this spider the orb (which has the fine, dry mesh with divergent radii) is not dome-shaped but rather is flatter and somewhat turned up at the rim. It has the extensive irregular webbing above and below to which the horizontal catching web is attached by guy lines as in the other two genera. The hub is closed and egg sacs are suspended separately and scattered about in the meshwork under the orb. The spider stays in a retreat in a patch of debris suspended in the irregular webbing just under the rim of the orb. It is nocturnal and rests in the hub only at night. Usually the web site is in dense brush about 1.5 m above the ground." [From letter by J. Carico (1992) about the female collected on the Bahama Islands.]

Distribution. Bahamas, Greater Antilles, Panama to northern Argentina (Map 4B).

Specimens Examined. BAHAMA ISLANDS Waterloo, Nassau, Mar. 1913, 2♀ (C. J. Maynard, J. E. Thayer, MCZ); San Salvador, 28 Dec 1991–4 Jan. 1992, 1♀ (J. Carico, MCZ).

PANAMA *Panama:* Pipeline Road, Gamboa, Aug., Sept. 1976, 1♀; Jan.–Feb. 1977, 1♀, 1♂ (M. Robinson, MCZ).

VENEZUELA *Bolívar:* Río Caura, Campamento Cecilia Magdalena, 7 May 1957, 1♀ (D. Rabayna, CAS). SURINAM *Brokopondo:* Brownsberg Reserve, 4°50′N, 55°15′W, May 1984, 1♀ (D. Smith, MCZ). COLOMBIA *Meta:* 6 km SW Puerto López, 1978, 1♀ (W. Eberhard 1487, MCZ). *Valle:* Cali, 1,000 m, 17 Oct. 1967, 1 imm. (W. Eberhard 45B, MCZ); June 1975, 1♀ (W. Eberhard, MCZ); 1976, 1♀ (W. Eberhard, MCZ). *Caqueta:* Río Orteguaza, 200 m, Aug., Sept. 1947, 1♀ (L. Richter, AMNH). ECUADOR *Sucumbíos:* Río Tarapoy, 20 Feb. 1989, 1 imm. (L. Avilés, MECN). PERU *Loreto:* Génaro Herrera, 100 m, 04°45′S, 73°45′W, 25 Aug. 1988, 1♀ (S. Silva, MUSM); Explorama Inn, 40 km NE Iquitos, 19–21 July 1989, 1♀ (H. V. Weems, FSCA); Pithecia, 5°11′S, 72°42′W, 16 Aug. 1989, 1♀ (D. Silva, MUSM); 27 May 1990, 1♀ (D. Silva, MUSM). *Huánuco:* Dantas la Molina, SW Puerto Inca, 270 m, 09°38′S, 75°00′W, 18 May–1 June 1987, 1♀ (D. Silva, MUSM); Monson Valley, Tingo María, 23 Sept.–10 Oct.1954, 1 imm., 1♀ (E. I Schlinger, E. S. Ross, CAS). *Pasco:* Huancabamba, Quebrada Castillo, NW Iscozacin, 10°10′S, 75°15′W, 6–9 Sept. 1983, 5 imm. (D. Silva, MUSM). *Madre de Dios:* Zona Reservada Pakitza, 6 Oct. 1987, 1♀ (J. Coddington, D. Silva, MUSM); Zona Reservada Manu, 5 km upstream from Pakitza, 11°58′S, 71°18′W, 4 Oct. 1987, 1 imm. (D. Silva, J. Coddington, USNM); Pueste de Vigil Pakitza, 11°58′S, 71°18′W, 4–6 Oct. 1987, 1 imm., 1♀ (D. Silva, J. Cod-

dington, USNM); Zona Reservada Tambopata, 290 m, 15 May 1988, 1♀ (D. Silva, MUSM). BRAZIL *Pará:* Caixuana, Melgaço, 15 Aug. 1996, 1♀ (A. A. Lise, MCP). *Amazonas:* Benjamin Constant, Sept. 1962, 1♀ (K. Lemke, MZSP 9541); Reserva do Km 41, 80 km N Manaus, 26 Feb. 1989, 1♀ (H. Fowler, E. Venticinque, R. S. Vieira, MCZ); Fazenda Esteio, 80 km N Manaus, 13 Jan. 1994, 1♀ (A. D. Brescovit, MCN 25362); Reserva Ducke, Manaus, 18–25 Feb. 1992, 1♀ (A. D. Brescovit, MCN 22033). *São Paulo:* Caraguatatuba, 10–16 July 1965, 1 imm. (Exped. Depto. Zool., MZSP 4934). *Rio Grande do Sul:* Garruchos, São Borja, 10 Nov. 1979, 1♂ (A. A. Lise, MCN 8673); Santa Maria, São Marcos, 24 Nov. 1995, 1♂ (C. Kotzian, L. Indrusiah, MCP). PARAGUAY *Concepción:* Apa, Aug. 1909, 1♀ (? E. Reimoser, AMNH); S. Louis [San Luis de la Sierra, 22°25′S, 57°27′W, R. Paynter and M. Caperton, 1977], Oct. 1908, 1♂ (? E. Reimoser, AMNH). ARGENTINA *Misiones:* Parque Nacional Iguazú, July 1985, 2 imm. (M. Ramírez, MACN).

Kapogea sexnotata (Simon) new combination
Figures 140–147; Map 4D

Cyrtophora sexnotata Simon, 1895b: 155. Female holotype from Tefé [Amazonas State], Brazil and Iquitos, Peru, in the MNHN, examined. Roewer, 1942: 751. Bonnet, 1956: 1368.

C. nympha Simon, 1895b: 156. Immature female holotype from San Esteban, Venezuela, in MNHN, examined. Roewer, 1942: 751. Bonnet, 1956: 1367. NEW SYNONYMY.

?*C. sellata:*—Blanke, 1976: 125, fig. 2, ♂ (not female).

Note. The male collected with a female of *K. sellata* in Vitoria, Espírito Santo, Brazil (Blanke, 1976) is *K. sexpunctata.*

Description. Female from 80 km N Manaus. Carapace orange-brown, darkest between eyes, but lightest between and posterior to anterior median eyes (Fig. 144). Chelicerae orange-brown, darkest distally. Labium, endites, sternum orange-brown with indistinct lighter patches. Legs orange-brown with indistinct lighter rings. Abdomen black with three pairs of white spots dorsally, first pair a streak, second and third pairs round, second pair smallest (Fig. 144). Anterior median eyes one diameter apart, 2.4 diameters from laterals. Posterior median eyes 1.5 diameters apart, 2.5 diameters from laterals. Laterals separated by diameter of posterior lateral eye. Total length 23 mm. Carapace 8.4 mm long, 6.2 wide in thoracic region, 3.5 wide in cephalic region. First femur 7.7 mm, patella and tibia 8.8, metatarsus 6.2, tarsus 2.3. Second patella and tibia 8.5 mm, third 5.2, fourth 7.0.

Male from 80 km N of Manaus. Carapace dark brown with area between eyes yellowish; a dark band between anterior eyes running to each posterior median eye. Chelicerae yellow-white with dark patch. Labium, endites brown and orange-brown. Sternum yellowish white with brown on sides, diffusing toward center. First coxae dark, others light. Legs yellowish white but with first femur dark brown, distal end of tibia with wide ring. Abdomen dorsally gray, lighter anteriorly with a pair of indistinct white lines; sides with broad dark bands narrowing ventrally and toward the posterior (Fig. 147). Venter gray with a pair of white brackets. Anterior median eyes 0.9 diameter apart, 0.7 diameter from anterior laterals. Posterior median eyes 0.9 diameter apart, 0.8 diameter from posterior laterals. Laterals separated by one-third the diameter of posterior lateral eye. Sternum with pair of slight transverse swellings anteriorly and in center with a small seta on pointed tubercle. Total length 3.2 mm. Carapace 1.57 mm long, 1.24 wide in thoracic region, 0.71 wide in cephalic region. First femur 1.44 mm, patella and tibia 1.55, metatarsus 1.00, tarsus 0.55. Second patella and tibia 1.43 mm, third 0.78, fourth 1.17.

Note. Males and females were matched because they were collected in abundance on the reservations 80 km north of Manaus, Brazil.

Variation. Total length of females 17.5 to 25 mm, males 2.8 to 3.3. Immature females and some adults have a pair of dorsal lines (Fig. 143) resembling *K. alayoi* (Fig. 136) but lack the anterior, lateral abdominal humps. Other immatures are patterned as in the adult. The illustrations were made from females and males from near Manaus, Brazil.

Diagnosis. The dorsal markings of the abdomen, three pairs of white spots on

black (Fig. 144), are diagnostic and distinguish this species from others. Some immatures have two white lines (Fig. 143) resembling *K. alayoi*, but have dorsal humps and may be larger than adult *K. alayoi*. The male can be distinguished from the other *Kapogea* species by its median apophysis, which has a pair of short filiform projections (between center and 3h in Fig. 145, center in Fig. 146); other species have only one such projection (M in Fig. 124, Figs. 121, 130, 137). Unfortunately, the median apophysis is soft, small and not easily examined. The long lobe of the terminal apophysis, unlike that of other species, has a lip distally from the palpus (at 12h in Fig. 145).

Natural History. The spider collected at Los Tayos, Ecuador, was on a single dead leaf, in a three-dimensional web, without obvious orb, and 1.5 m across in several directions.

Distribution. Venezuela, upper Amazon area (Map 4D).

Specimens Examined. VENEZUELA *Bolívar:* Río Caura, Campamento Cecilia Magdalena, 7 May 1957, 1 imm. (D. Robayna, CAS). ECUADOR *Sucumbíos:* Reserva Faunistica Cuyabeno, Laguna Grande, Sendero, 0°00′, 76°10′W, 26 June 1988, 1♀ (W. Maddison, 88–006, MCZ), 1 Apr. 1994, 1 imm. (G. Estévez, MECN). *Morona-Santiago:* Los Tayos, 3°06′S, 78°12′W, 29 July 1976, 1 imm. (MCZ). PERU *Loreto:* Tipishca del Río Samiria, 8 May 1990, 1♀ (D. Silva, MUSM); Génaro Herrera, 04°45′S, 73°45′W, 23–28 June 1988, 4♀ (D. Silva, MUSM); Pithecia, 05°11′S, 72°42′W, 14 Aug. 1989, 1♀ (D. Silva, MUSM); Estirón, Río Ampiyacu, 13 Nov. 1961, 1♀ (B. Malkin, AMNH); Río Bombo, Alto Tapiche [04°59′S, 73°51′W, Stephens and Traylor, 1983], Jan. 1928, 1♀ (H. Bassler, AMNH). *Amazonas:* Alto Río Comaina, Puesto de Vigilancia Falso Paquisha, 21 Oct–3 Nov. 1987, 1♀ (D. Silva, MUSM). *Cajamarca:* Río Chinchipe nr. San Ignacio, 1,200 m, July 1948, 1♀ (W. Weyrauch, CAS). *Ucayali:* Divisoria, 1,700 m, 23 Sept.–3 Oct. 1946, 1 imm. (F. Woykowski, AMNH). *Huánuco:* Dantas La Molina, Quebrada Sapote, SW Puerto Inca, 09°38′S, 75°00′W, 18 May–1 June 1987, 1♀ (D. Silva, MUSM). [? *Lima*]: Aquaitia [? Aquicha], 1, 2 Sept. 1946, 33♀ (F. Woytowski, AMNH). *Madre de Dios:* Zona Reservada Pakitza, 13 Oct. 1991, 1♀ (D. Silva, MUSM). BRAZIL *Amazonas:* Rio Negro Umarituba, 16 Apr. 1924, 1♀ (A. Roman, NRMS); Manaus, Reserva Ducke, 25 Aug. 1977, 1♀ (Y. Lubin, MCZ); 80 km N Manaus, 2°24′S, 59°52′W, 1989, 1♀; 17 Jan. 1989, 1♂; 26 Feb. 1989, 1 imm.; 9 Mar. 1989, 1♂; 11 June 1989, 1 imm.; 8 July 1989, 1♂; 22 Aug. 1989, 1 imm.; 8 Sept. 1989, 1♀ (all H. G. Fowler, MCZ); Reserva Cabo Frio, 80 km N Manaus, 9 Apr. 1989, 1♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ); Reserva Colosso, 24 Nov. 1988, 1♀; 10 Nov. 1988, 4 imm., 3♀ (H. G. Fowler, MCZ); 18 Jan. 1989, 1 imm., 1♀; 8 July 1989, 1 imm, 1♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ); Reserva Dimona, 80 km N Manaus, 1889–1992, 3 imm. (H. G. Fowler, MCZ); 27 Mar. 1991, 1♀ (H. Fowler, R. S. Vieira, E. Venticinque, MCZ); Reserva Porto Alegre, 80 km N Manaus, 1989–1992, 1♀ (H. G. Fowler (MCZ). *Rondônia:* Fazenda Rancho Grande, NE Cacaulandia, 6–15 Dec. 1990, 1 imm. (J. E. Eger, FSCA). BOLIVIA *Beni:* Chacobo Indian Village, 12°30′S, 66°W, July, Aug. 1960, 3♀ (B. Malkin, AMNH); Est. Biol. Beni, 225 m, 14°47′S, 66°15′W, 8–14 Nov. 1989, 1♂ (J. Coddington et al., USNM).

Cyrtophora Simon

Cyrtophora Simon, 1864: 262. Type species *C. citricola* designated by Simon, 1895a: 775. Neave, 1939a: 951. The gender of the name is feminine (Bonnet, 1956: 1360).

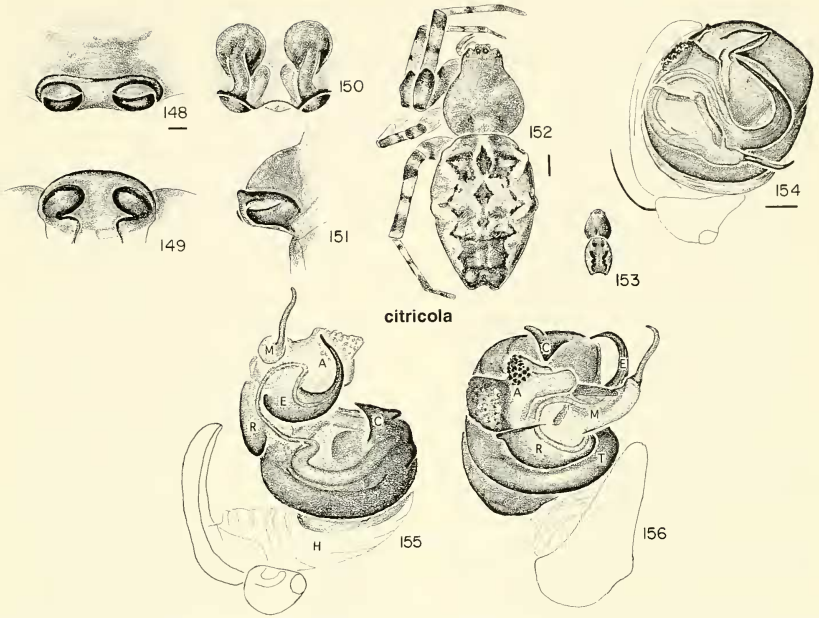
Euetria Thorell, 1890: 109. Type species *C. molluccensis*. Neave, 1939b: 323. Simon (1895a: 771) synonymized *Euetria* [sic] with *Cyrtophora*.

Evetria:—Simon, 1893: 322. An invalid "correction" of Thorell's spelling of *Euetria*. The name *Evetria* is preoccupied by Huebner, 1825 (as cited in Neave, 1939b: 386).

Diagnosis. Cyrtophora differs from other araneids (except *Argiope*, *Gea*, *Mecynogea*, *Manogea* and *Kapogea*) by the proportions of the leg articles, having the second to fourth combined patella and tibia slightly shorter than the femur of the same leg and also shorter than the combined metatarsus and tarsus of the same leg. Additional characters are the relatively heavy legs, and the slight separation of the lateral eyes.

Cyrtophora differs from *Argiope*, *Gea* and *Mecynogea* by having the posterior eye row recurved or straight. It differs from *Manogea* by having a wide cephalic region of the carapace.

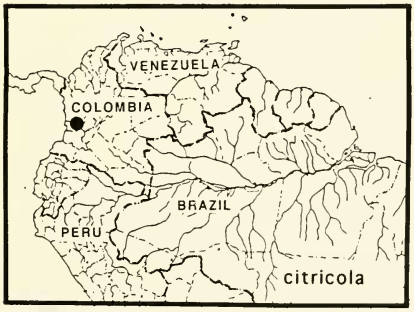
Cyrtophora differs from *Kapogea* by having the posterior eye row usually recurved (Fig. 152), the openings of the epigynum sclerotized (Figs. 148–151; [9] in Table 1), the embolus (E) of the palpus placed near the median apophysis (Fig. 154, M in Fig. 156), and the embolus supported by the conductor (Fig. 154, C in



Figures 148–156. *Cyrtophora citricola* (Forskål). 148–152, female. 148–151, epigynum. 148, ventral; 149, posterior; 150, dorsal, cleared; 151, lateral. 152, dorsal. 153–156, male. 153, dorsal. 154–156, left male palpus. 154, mesal; 155, expanded, submesal. 156, expanded, dorsal.

Abbreviations. A, terminal apophysis; C, conductor; E, embolus; H, hematodocha; M, median apophysis; R, radix; T, tegulum.

Scale lines: genitalia 0.1 mm; others 1.0 mm.



Map 5. Distribution of *Cyrtophora citricola* in America.

Fig. 155). Also the abdomen may have more than one pair of humps and may be posteriorly biforked (Fig. 152; [3] in Table 1).

As in *Kapogea*, but unlike *Mecynogea* and *Manogea*, the males are dwarfed and the females large (Figs. 152, 153).

Natural History. The orb web of *Cyrtophora* is horizontal, has a very fine mesh and lacks viscous threads. It has been described for a number of species.

Australians and South Africans refer to the *Cyrtophora* species as tent spiders (Lubin, personal communication).

Distribution. Cyrtophora has many species world-wide in warmer areas; only one

is introduced in America. The species from Africa are least known.

Misplaced Species. Argiope marxi McCook, 1894: 223, is *Cyrtophora moluccensis* (synonymized by Levi, 1968: 334) with an erronous G. Marx locality.

Cyrtophora californensis Keyserling, 1885, is a *Eustala* (Levi, 1977: 104).

C. davisi (Hingston, 1932; Levi, 1991: 179) is a *Spilasma* (Levi, 1995: 187).

C. lodiculafacies (Hingston, 1932: 365) is not a *Cyrtophora* (Levi, 1995: 209). The web is horizontal but not *Cyrtophora*-like (Hingston, 1932: figs. 45, 46). It is a *Dolichognatha* according to W. Eberhard (personal communication).

C. vachoni Caporiacco, 1954: 82 is an immature *Azilia* (Tetragnathidae). NEW COMBINATION.

Cyrtophora citricola (Forskål)
Figures 148–156; Map 5

Aranea citricola Forskål, 1775: 86.
Cyrtophora citricola:—Simon, 1864: 262. Roewer, 1942: 747. Bonnet, 1956: 1362.

Description. Both sexes with posterior eye row strongly recurved (Figs. 152–153). Lateral eyes separated by diameter of posterior lateral eyes. Total length of female about 10.3 mm, male about 3.1. Palpus of male without patellar setae, but two long setae on palpal tibia. Endite without tooth. Conductor attached to outer edge of tegulum (Figs. 155, 156).

Distribution. Mediterranean, Africa, southern Asia, recently found introduced in southern Colombia.

Natural History. The spider is abundant in ornamental trees, wild trees and fruit trees. The fine, strong web tangles up the branches of trees until these die through asphyxiation. Within the web we have observed both nocturnal and diurnal insects, as well as harmful and beneficial ones. From the nearby highway it is possible to see many trees completely dried up and dead, tangled up in the web (letter from N. C. Mesa C., Aug. 1996, Palmira, Colombia).

Records. COLOMBIA *Valle*: Cauca Valley, July 1996, 4♀ (H. Kuratomi, MCZ).

LITERATURE CITED

ARCHER, A. F. 1958. Studies in the orbweaving spiders (Argiopidae) 4. American Museum Novitates, **1922:** 1–21.

———. 1963. Catálogo de las arañas chilenas de las familias de la Division Metarachnae. Publicación Ocasionales del Museo Nacional de Historia Natural, Santiago de Chile, no. 1, pp. 1–32.

BADCOCK, H. D. 1932. Reports of an expedition to Paraguay and Brazil in 1926–1927. Journal of the Linnean Society (Zoology), London, **38:** 1–48.

BANKS, N., IN BANKS, N., N. M. NEWPORT, AND R. D. BIRD. 1932. Oklahoma spiders. Publications of the University of Oklahoma, Biological Survey, **4:** 7–49.

BLANKE, R. 1976. Über das unbekannte Männchen von *Cyrtophora sellata* Simon (Araneae, Araneidae). Beitrag der naturkundlichen Forschung Südwest Deutschlands, **35:** 25–127.

BONNET, P. 1955. Bibliographia Araneorum. Toulouse: Les Frères Douladoure, **2**(1): 1–918.

———. 1956. Bibliographia Araneorum. Toulouse: Les Artisans de L'Imprimerie Douladoure **2**(2): 919–1925.

———. 1957. Bibliographia Araneorum. Toulouse: Les Artisans de L'Imprimerie Douladoure **2**(3): 1927–3026.

———. 1959. Bibliographia Araneorum. Toulouse: Les Artisans de L'Imprimerie Douladoure **2**(5): 4231–5058.

BRIGNOLI, P. 1983. A Catalogue of the Araneae Described between 1940 and 1981. Manchester: Manchester Univ. Press. 755 pp.

CAMBRIDGE, F. P.-. 1904. Arachnida. Araneidea and Opiliones, pp. 465–545. *In* Biologia Centrali-Americana, Zoologia, London:

CAMBRIDGE, O. P.-. 1889. Arachnida, Araneidea, pp. 1–56. *In* Biologia Centrali-Americana, Zoologia, London:

CAPORIACCO, L. DI. 1947. Diagnosi preliminari di specie nuove di aracnidi della Guiana Brittanica. Monitores Zoologico Italiano, **56:** 20–34.

———. 1948. Arachnida of British Guiana collected by Prof. Beccari. Proceedings of the Zoological Society of London, **118:** 607–747.

———. 1954. Araignées de la Guyane Française du Muséum d'Histoire Naturelle de Paris. Commentationes Pontifica Academia Scientiarum, **16:** 45–193.

CARICO, J. E. 1984. Secondary use of the removed orb web by *Mecynogea lemniscata* (Walckenaer). Journal of Arachnology, **12:** 357–361.

CHAMBERLIN, R. V., AND W. IVIE. 1936. New spiders from Mexico and Panama. Bulletin of the University of Utah, Biological Series, **27**(5): 1–103.

CODDINGTON, J. A. 1989. Spinneret silk spigot morphology: evidence for the monophyly of orbweaving spiders, Cyrtophorinae (Araneidae), and

the group Theridiidae plus Nesticidae. Journal of Arachnology, **17:** 71–95.

Forskål, P. 1775. Descriptiones Animalium, Avium, Amphibiorum, Piscium, Insectorum, Vermium; quae in itinere orientali observavit Petrus Forskal. Hauniae, [Araneae]: 85–86.

Franganillo Balboa, P. 1936. Los arácnidos de Cuba hasta 1936. La Habana: Cultural, S.A 183 pp.

Hieber, C. S. 1984. Egg predators of the cocoons of the spider *Mecynogea lemniscata* (Araneae: Araneidae): rearing and population data. Florida Entomologist, **67:** 176–178.

Hingston, R. W. G. 1932. A naturalist in the Guiana forest. London: Arnold & Co. 348 pp.

Holmberg, E. L. 1876. Los arácnidos argentinos. Anales de Agricultura, **4:** 143, 160.

Keyserling, E. 1881. Neue Spinnen aus Amerika. Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien, **30:** 547–582, pl. 16.

———. 1885. Neue Spinnen aus Amerika. Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien, **34:** 489–534, pl. 13.

———. 1893. Die Spinnen Amerikas, Epeiridae. Nürnberg: Verlag von Bauer und Raspe, **4:** 209–377.

Koch, C. L. 1839. Die Arachniden. Nürnberg: in der C.H.Zeh'schen Buchhandlung **5:** 1–158.

Kovoor, J., and A. Lopez. 1982. Anatomie et histologie des glandes séricigènes des *Cyrtophora* (Araneae, Araneidae): affinités et corrélations avec la structure et la composition de la toile. Revue Arachnologique, **4:** 1–21.

———. 1988. L'appareil séricigènes des *Mecynogea* Simon (Araneae, Araneidae). Revue Arachnologique, **7:** 205–212.

Kraus, O. 1955. Spinnen aus El Salvador. Abhandlungen herausgegeben von der senckenbergischen naturforschenden Gesellschaft, **493:** 1–112.

Levi, H. W. 1968. The spider genera *Gea* and *Argiope* in America (Araneae: Araneidae). Bulletin of the Museum of Comparative Zoology, **136**(9): 319–352.

———. 1977. The American orb-weaver genera *Cyclosa, Metazygia* and *Eustala* North of Mexico (Araneae, Araneidae). Bulletin of the Museum of Comparative Zoology, **148:** 61–127.

———. 1980. The orb-weaver genus *Mecynogea*, the subfamily Metinae and the genera *Pachygnatha, Glenognatha* and *Azilia* of the subfamily Tetragnathinae north of Mexico (Araneae: Araneidae). Bulletin of the Museum of Comparative Zoology, **149:** 1–75.

———. 1986. The Neotropical orb-weaver genera *Chysometa* and *Homalometa* (Araneae: Tetragnathidae). Bulletin of the Museum of Comparative Zoology, **151:** 91–215.

———. 1988. The Neotropical orb-weaving spiders of the genus *Alpaida* (Araneae: Araneidae). Bulletin of the Museum of Comparative Zoology, **151:** 365–487.

———. 1991. The Neotropical and Mexican species of the orb-weaver genera *Araneus, Dubiepeira* and *Aculepeira* (Araneae: Araneidae). Bulletin of the Museum of Comparative Zoology, **152:** 167–315.

———. 1993. The Neotropical orb-weaving spiders of the genera *Wixia, Pozonia* and *Ocrepeira* (Araneae: Araneidae). Bulletin of the Museum of Comparative Zoology, **153:** 47–141.

———. 1995. Orb-weaving spiders *Actinosoma, Spilasma, Micrepeira, Pronous* and four new genera (Araneidae: Araneae). Bulletin of the Museum of Comparative Zoology, **154:** 153–213.

———. 1996. The American orb weavers *Hypognatha, Encyosaccus, Xylethrus, Gasteracantha,* and *Enacrosoma* (Araneae, Araneidae). Bulletin of the Museum of Comparative Zoology, **155:** 89–157.

Marx, G. 1883. Araneina, pp. 21–26. *In* L. O. Howard, A List of the Invertebrate Fauna of South Carolina. Washington: U.S. Agricultural Dept. 47 pp.

McCook, H. C. 1878. The basilica spider and her snare. Proceedings of the Academy of Natural Sciences of Philadelphia, **1878:** 124–135.

———. 1894. American spiders and their spinning-work, Vol. 3. Self-published, Academy of Natural Sciences of Philadelphia. 285 pp.

Mello-Leitão, C. F. de. 1933. Catalogo das aranhas argentinas. Archivos da Escola superior de agricultura e medicina veterinaria, Rio de Janeiro, **10:** 3–63.

———. 1936. Etude sur les arachnides de Papudo et Constitucion (Chili), recueilles par le prof. Dr. Carlos Porter. Revista Chilena de Historia Natural, **40:** 112–129.

———. 1939. Araignées américaines du musée d'histoire naturelle de Bâle. Revue Suisse de Zoologie, **46:** 43–93.

———. 1944. Algumas aranhas da região amazonica. Boletim de Museu Nacional de Rio-de-Janeiro, **25:** 1–12.

———. 1948. Contribuição ao conhecimento da fauna araneológica da Guianas. Anais da Academia Brasileira de Ciencias, **20:** 151–196.

Neave, S. A. 1939a. Nomenclator Zoologicus, A–C, Vol. 1. Zoological Society of London. 957 pp.

———. 1939b. Nomenclator Zoologicus, D–L, Vol. 2. Zoological Society of London. 1025 pp.

———. 1940. Nomenclator Zoologicus, M–P, Vol. 3. Zoological Society of London. 1065 pp.

Paynter, R. A. Jr. 1995. Ornithological Gazetteer of Argentina, 2nd edition. Cambridge: Museum of Comparative Zoology. 1043 pp.

Paynter, R. A. Jr., and A. M. G. Caperton. 1977. Ornithological Gazetteer of Paraguay. Cambridge: Museum of Comparative Zoology. 43 pp.

Peters, H. M. 1993. Functional organization of the spinning apparatus of *Cyrtophora citricola* with regards to the evolution of the web (Araneae, Araneidae). Zoomorphology, **113:** 153–163.

PETRUNKEVITCH, A. 1911. Synonymic Index-Catalogue of Spiders of North, Central and South America. Bulletin of the American Museum of Natural History, **29:** 1–791.

ROEWER, C. F. 1942. Katalog der Araneae von 1758 bis 1940. Bremen: Kommissions-Verlag von "Natura", **1:** 1–1040.

SCHENKEL, E. 1953. Bericht über einige Spinnentiere aus Venezuela. Verhandlungen der naturforschenden Gesellschaft, Basel, **64:** 1–57.

SIMON, E. 1864. Histoire Naturelle des Araignées (Aranéides). Paris: Librairie Encyclopédique de Roret. 540 pp.

———. 1893. Descriptions d'espèces et de genres nouveaux de l'ordre des Araneae. Annales de la Société entomologique de France, **62:** 299–330.

———. 1895a. Histoire Naturelle des Araignées. Paris: Librairie Encyclopédique de Roret, **1:** 761–1084.

———. 1895b. Description d'espèces et de genres nouveaux de l'ordre des Aranae. Annales de la Société Entomologique de France, **64:** 131–160.

———. 1903. Descriptions d'arachnides nouveaux. Annales de la Societé Entomologique de Belgique, **47:** 21–39.

SOARES, B. A. M., AND H. F. DE ALMEIDA CAMARGO. 1948. Aranhas coligidas pela Fundação Brasil-Central (Arachnida-Araneae). Boletim do Museu Paraense E. Goeldi, **10:** 355–409.

———. 1955. Algumas novas espécies de aranhas brasileiras. Arquivos do Museo Nacional, Rio de Janeiro, **42:** 577–380.

STEPHENS, L., AND M. A. TRAYLOR. 1983. Ornithological Gazetteer of Perú. Cambridge: Museum of Comparative Zoology. 273 pp.

THORELL, T. 1890. Studi sui ragni malesi e papuani. Parte IV. Ragni dell' Indo Malesia, *In* O. Beccari, G. Doria, H. Forbes, AND J. G. H. Kinberg (eds.), Annali del Museo Civico di Storia Naturale di Genova, Ser. 2, Vol. 8. 419 pp.

WALCKENAER, C. A. 1841. Histoire naturelle des insectes. Aptères. Paris: Librairie Encyclopédique de Roret **2:** 1–548.

WILLEY, M. B., M. A. JOHNSON, AND P. H. ADLER. 1992. Predatory behavior of the basilica spider, *Mecynogea lemniscata* (Araneae: Araneidae). Psyche, **99:** 153–168.

WISE, D. H. 1993. Spiders in Ecological Webs. Cambridge, England: Cambridge Univ. Press. 328 pp.